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AUTHOR Pulido, Josefina; Almendares, Simon
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ABSTRACT

Four resource units are included in this document. For each, general objectives on knowledge and concepts, skills, and attitudes are given; content is outlined; and some suggestions for initiating the unit are listed. The first unit, on measuring length, provides six lesson plans, to teach about the meter, the smaller units of the meter, units larger than the meter, and converting within the metric system. Over 25 activity worksheets follow; each uses both English and Spanish (on reverse sides). The second unit focuses on measuring weight/mass, with three lesson plans on the gram, smaller and larger measures, and converting. Over 20 activity worksheets in English and Spanish follow. The focus of the third unit is on measuring capacity/volume, with three lesson plans on liters, smaller and larger measures, and converting. About 20 activity worksheets follow. In the fourth unit, the focus is on temperature, with four lesson plans on developing the concept of temperature, learning about thermometers, learning to read a Celsius scale, and relating estimates with measures. About 15 activity worksheets are included. (MNS)

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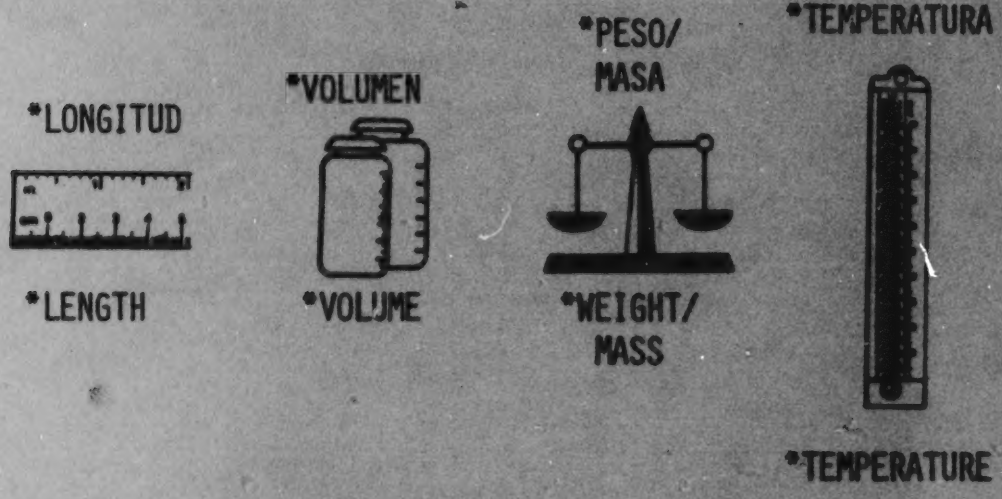
METRIC SYSTEM RESOURCE UNITS

UNIDADES DE TRABAJO DEL SISTEMA METRICO DECIMAL

K - 12

Project C.A.M.B.I.O.

Changing Attitutes towards Metrics for Bilingual Instruction & Operations



Dr. Josefina Pulido

Ing. Simón Almendares

THE NATIONAL HISPANIC UNIVERSITY
NATIONAL HISPANIC CENTER FOR ADVANCED STUDIES/BABEL
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RESOURCE UNIT
(Unidad de Trabajo)

METER: Measuring Length
(EL METRO : Medida de Longitud)

1 metro y
10 centimetros
1.10 m.

1 meter &
10 centimeters
1.10 m.

Dr. Josefina Pulido

Simón Almendares

RESOURCE UNIT

I. Title: Meter: Measuring Length

II. General Objectives

A. Knowledge and Concepts

1. To develop in the children knowledge and understanding of:

a. The concept of "length".

b. The meter as standard unit of measuring length.

c. The concept of meter and its parts (smaller and bigger units).

d. Other units for measuring length: dekameter, hectometer, and kilometer.

e. When to appropriately use the meter, decimeter, centimeter, millimeter, dekameter, hectometer and kilometer.

f. The process of converting metric big units to smaller units or smaller units to bigger units.

2. To aquaint the children with real life situations or problems that call for measurement skills.

B. Skills

To develop in children the ability to:

a. Identify the meter and its smaller and bigger units.

b. Use appropriately different units of measurement.

c. Use different kinds of measuring instruments.

d. Solve problems involving the use of linear measures.

C. Attitudes

To develop in the children:

a. An appreciation of the importance of the knowledge of and skills in measuring length.

b. The feeling that the measurement by using the metric system is easy.

c. The importance of accuracy in measurement.

III. Content Outline

A. What is length?
What is the standard unit for measuring length?

B. The smaller parts of a meter: decimeter, centimeter, millimeter.

C. The bigger units in measuring length: dekameter, hectometer, kilometer.

D. Manipulating the meter and its smaller parts: decimeter, centimeter, millimeter and other common tools of measurement.

E. Converting smaller units into bigger units or vice versa.

F. Problem solving which is integrated with topics A, B, C, D, E.

IV. Developing the Unit

Initiating the unit - some suggestions:

1. Start a conversation with the class asking the children if they had had experiences relative to measuring objects and if they know how to use measurement tools and instruments. Use this discussion to introduce the new unit.

2. Structure the room with pictures relating to the ways different measuring instruments are used. Relate these to the new unit.

3. Introduce the new unit directly. Encourage the children to raise questions they would like answered about the measurement of length and about measuring instruments. Write all the questions on the board.

4. Take the children out of the classroom to a place where there are structures of the building which needed knowledge of and skills in measurement. Lead this discussion to the importance of having skills in measuring and of accuracy in measurement.

INSTRUCTIONAL ACTIVITIES

LESSON 1

OBJECTIVES: After the lesson, the children will be able to:

A. Name different objects that have "length".

B. Identify the meter as the basic unit of metric linear measurement.

C. Tell in simple terms what the word length means.

D. Manipulate the meter in measuring various objects in the classroom and outside the classroom.

MATERIALS NEEDED

- Pictures (as indicated in the activities that follow)
- Pencils
- Strips of adding machine paper one meter long
- Meter stick
- Classroom objects
- Colored pens

ACTIVITIES - MEASURING LENGTH

A. Introduce to the children the concept that one object can be measured by another object. Demonstrate this by measuring your desk with a pencil. Let the children count how many pencils long your desk is. Ask the children to measure the desk with the same pencil. Tell the children that everything that can be measured in that way is considered length.

B. Have each child measure the length of the blackboard using arbitrary units such as pencils, the width of his/her hand, or his/her hand spread.

C. Write on the blackboard the word meter and its symbol m. Pronounce the word meter and explain that m is a short way to write the word meter. Show the meter stick and introduce it as the "standard" unit of measuring length.

D. Give each child one meter of adding machine paper; ask them to measure some distances and record them.

E. Ask children to find with the aid of their meter at least 3 items that are less than a meter, 3 items that are about a meter, and 3 items that are more than a meter.

F. Ask the children to estimate the length of some objects in the room and then to actually measure the objects and to compare the estimates with the actual measurements.

G. Ask the children to cite situations where there is need to use the meter stick.

H. Ask the children to design, draw and color their meter for their own use in measuring objects and distances.

Information for the Teacher

THE METER

Scientists have agreed that a meter is "1650 763.73 wavelengths of the orange-red light of the isotope Koypton -86, measured in a vacuum." When the National Assembly of France requested the French Academy of Sciences to create a standard system for weights and measures based on the real world, it was determined that the meter was 1/10-millionth of the distance from the North Pole to the equator.

A meter is the same length high on a mountain-top as it is in a submarine deep in the ocean. It is not affected by altitude. It is the same length in the hot equator as in the cold of the Artic Circle.

Source: Jerolyn Ann Nentl, The Meter Is; U.S.: Crestwood House, Inc., 1976.

LESSON 2

OBJECTIVES: After the lesson, the children will be able to:

A. Identify the smaller units of the meter: The DECIMETER and the CENTIMETER.

B. Identify and name the symbols of the meter and its smaller units.

C. Manipulate the instrument using the decimeter and centimeter in measuring actual objects.

D. Identify situations where the use of these smaller units of measure are applicable.

MATERIALS NEEDED

. Rulers in centimeters

. Rulers in centimeters and millimeters

. Worksheets

. One meter of adding machine tape

ACTIVITIES

A. Children will divide the adding machine tape into ten equal parts.

B. Children will name each part of the meter as a decimeter and they will write the symbol "dm" on the adding machine tape. Tell them that deci means "1 tenth of". Emphasize that 10 dm = 1 m.

C. Have the children make a list of all the things they estimate to be one decimeter long. Measure objects and compare results.

D. Have children make lists of objects estimated to be 2 dm in length. Measure objects and compare results.

E. Distribute centimeter rulers (do not at this time use rulers with millimeter markings).

G. Children will name each marking as a centimeter and will write the symbol on a piece of paper. Tell them that centi means "one hundredth of". Emphasize that 100 cm = 1 m.

H. Have children measure the length of various objects using the centimeter rulers; e.g., the length of a book, of the desk, width of a piece of paper, etc.

I. Have children work in small groups to provide experience in measuring with a cm ruler their heights and have them record their measurements.

J. A review of the fact that 10 decimeter = 1 meter will be made. A review of the fact that 100 centimeters = 1 meter will be made.

LESSON 3

OBJECTIVES: After the lesson, the children will be able to:

A. Identify and name the smallest unit of the meter: the MILLIMETER.

B. Identify the symbol of the millimeter and to use the measuring instrument by measuring actual objects in millimeters.

MATERIALS NEEDED

. Rulers in centimeters and millimeters

. Worksheets

. Different small objects

ACTIVITIES

A. Brief review of the meter, decimeter and centimeter.

B. Children will name the smallest markings as a millimeter and will write the symbol on a piece of paper. Tell them that milli means one thousandth of. Emphasize that 1000 mm = 1 m.

C. Introduce the millimeter as a useful unit for measuring camera film, the diameters of shirt buttons, wire used in jumbo paper clips, the diameter of a ring, etc.

D. Provide students with an opportunity to estimate and measure objects in the room in mm.

E. A review of the fact that 1000 millimeters - 1 meter will be made.

F. Let the class make a chart sumarizing the relationship of the meter, the decimeter, the centimeter and the millimeter as follows:

1 meter = 10 decimeter
1 decimeter = 10 centimeter
1 centimeter = 10 millimeters
1 meter = 10 decimeters
1 meter = 100 centimeters
1 meter = 1000 millimeters

LESSON 4

OBJECTIVE

A. Children will be able to learn that for bigger things and longer distances, there are three other units of measurements: DEKAMETER, HECTOMETER and KILOMETER.

B. They will also become acquainted with a shorter way to write the units of measurement; the smaller ones and the bigger ones.

MATERIALS NEEDED

. Different pictures of cities, monuments, buildings, etc.

. Metric maps

ACTIVITIES

A. Introduce the lesson by asking questions like: If you measure the distance from your house to the school, would you use the centimeter? The millimeter? Why not?

B. Children will learn how to write the symbols of the bigger units of the meter: Dekameter, Hectometer and Kilometer.

C. Practice with the children the meaning of the prefixes telling them that:

DEKA means 10 (ten)
HECTO means 100 (hundred)
KILO means 1000 (thousand)

D. Emphasize the kilometer and relate a kilometer to the length of a city block. Tell the students that a city block is about 100 meters long. Tell your students to walk ten blocks on a Saturday.

E. Have a map that has distances shown in kilometers and point out that the map has been drawn to a scale of 1 cm to 1 km; that is, each centimeter on the map represents 1 kilometer. Compare various distances shown on the map.

F. Ask the students to remember the seven words to measure length in the metric system: millimeter, centimeter, decimeter, meter, dekameter, hectometer, and kilometer. Tell them that of the seven new units of measurement, they probably will use only four of them very often: meter, centimeter, millimeter and kilometer.

LESSON 5

OBJECTIVE

Children will be able to convert big units into smaller units.

MATERIALS NEEDED

- Meter stick
- Rulers indicating decimeter, centimeters, and millimeters

ACTIVITIES

A. Give a short snappy drill on multiplying by tens, hundreds, and thousands.

B. Give situations to make children realize the need to know the importance of conversion.

Examples:

Marge knows that she is 12 decimeters tall but her teacher wants her to record her height in centimeters. How many centimeters tall is she?

Mother needs a meter of material to make a blouse. She sees two pieces of the same material in the store. One piece is 53 cm, the other is 59 cm. Would the two pieces be enough?

C. Show the children how to convert <u>big</u> units into smaller units.

D. Give the children various exercises of conversion using the concept taught.

Examples:

5 cm = _____mm
15 cm = _____mm
2.5 cm = _____mm
30 dm = _____cm
6.7 dm = _____cm
7 dm = _____cm
35 km = _____m
7 km = _____m
5.6 km = _____m

LESSON 6

OBJECTIVE

Children will be able to convert small units into bigger units.

MATERIALS NEEDED

- Meter stick
- Rulers indicating decimeters, centimeters, and millimeters.

ACTIVITIES

A. Give a short snappy drill on dividing by tens, hundreds, and thousands.

B. Give situations to make children realize the need to know the importance of conversion.

Examples:

The door in the classroom was measured by Luis and he found that it was 200 cm long but his teacher asked him to report in meters. How many meters long is the door?

Rita's mother wants to make curtains for a window. The window is 2 meters high. She has a piece of cloth that is 250 cm long. Is the cloth long enough for the window?

C. Show the children how to convert small units into bigger units.

D. Give the children various exercises to apply the principle.

Examples:

Change the following as indicated.

4000 m = _____km
35000 m = _____km
15000 m = _____km
50 mm = _____cm
20 mm = _____cm
40 mm = _____cm
100 cm = _____m
300 cm = _____m
2000 cm = _____m

ACTIVITIES

ACTIVIDADES

LENGTH

LONGITUD

COMPARATIVE VOCABULARY

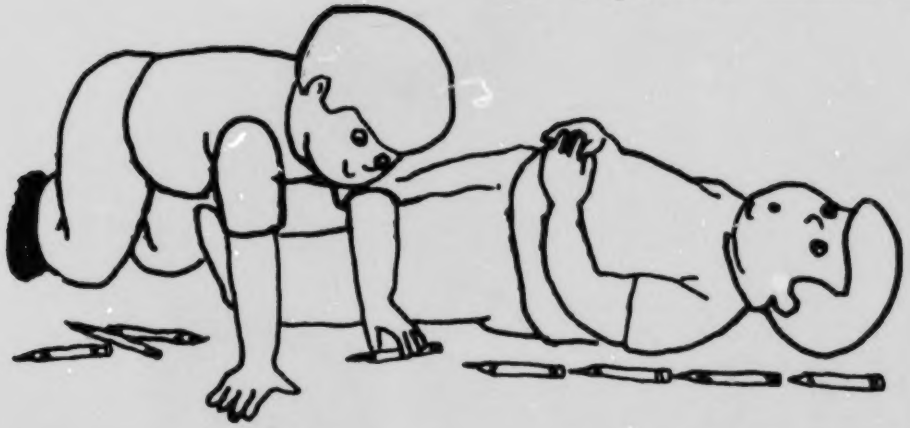
Choose an object from the box. Compare it to the other objects in the box, placing them next to the correct sign.

VOCABULARIO COMPARATIVO

Escoge un objeto de la caja. Compáralo con las otras cosas en la caja. Colócalo en frente del letrero correcto.

NON-STANDARD UNITS

Choose an object to measure. Using one of the units given, estimate, then measure how long it is. Find as many objects and use as many units as you can. Remember to estimate first.



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Object								

UNIDADES ARBITRARIAS

Escoge un objeto para medirlo usando una de las unidades que se te dan. Trata de adivinar la longitud del objeto y luego verifícala midiéndolo. Trata de medir los objetos que más puedas usando las unidades que se te dan. Recuerda que debes de adivinar primero.

Objeto								

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METER

Cut some adding machine tape 1 meter long.
Draw and color a monster or any other design you like on the tape.
Compare your meter monster to things you think are 1 meter.
Put the name of the object on the right column.

Less than a meter	About a meter	More than a meter

METRO

Corta una tira de un metro de papel para calculadora.
Dibuja y colorea un monstruo u otro diseño que te guste en la tira de papel.
Compara tu metro monstruo con otra cosa que creas que mide un metro.
Enlista las cosas en las columnas de abajo.

Menos que un metro	Casi un metro	Más que un metro

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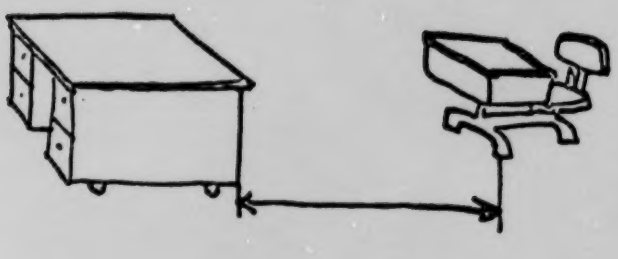
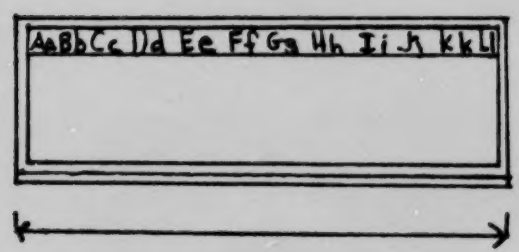
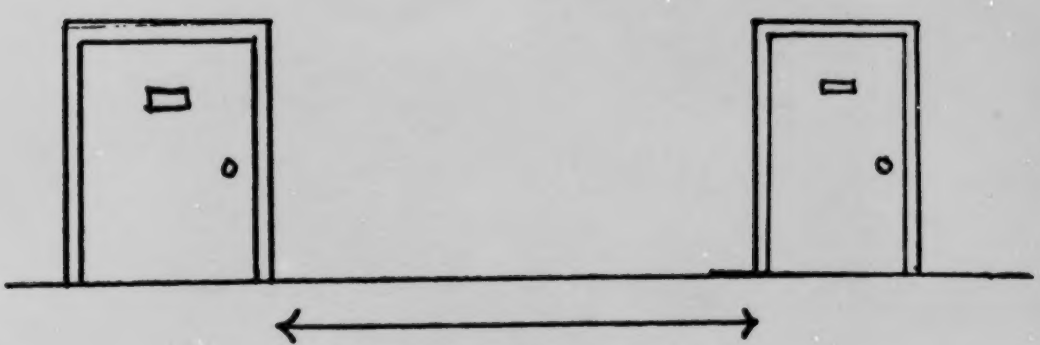
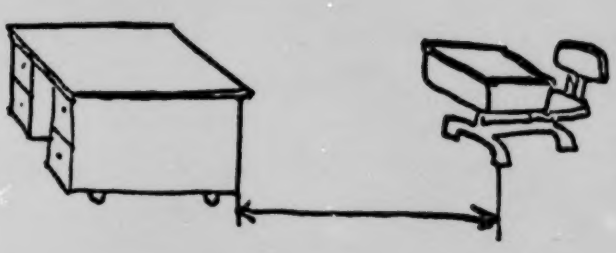
Use the meter to measure the following distances.

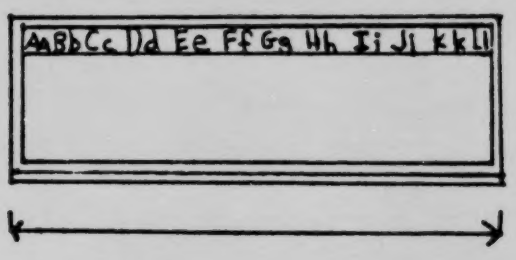


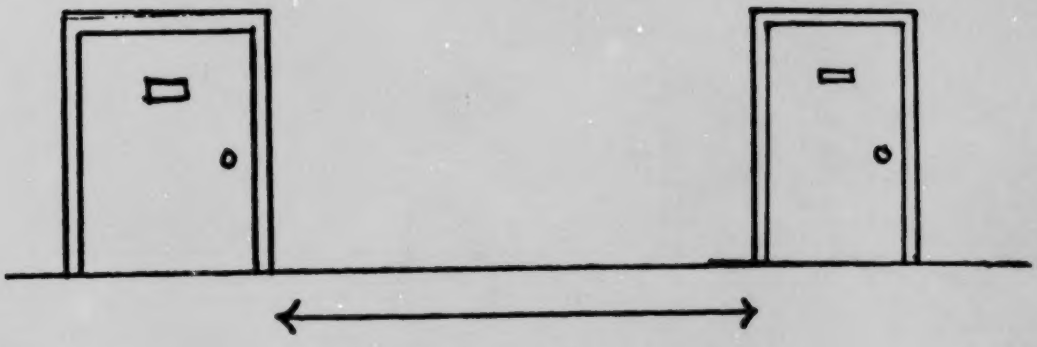




Usa el metro para medir las siguientes distancias.







Measure as many long objects as you can with your meter stick. Record everything; estimate first and then measure.

Things to Measure	My Estimate	Measurement
Length of blackboard		

Mide todos los objetos grandes con tu metro. Apúntalos; calcula primero y luego mide.

Cosas para medir	Cálculo	Medida
Largo del Pizarrón		

ESTIMATING WITH METRICS

List at least 5 things that are about 1 meter long.

Then list 5 that are more than 1 meter long and 5 that are less than 1 meter.

Try to list as many as you can for each column.

Less than a meter	About a meter	More than a meter

How many pencils are about as long as 1 meter? _____

How many crayons? _____ How many books? _____

How many paper clips? _____ How many baseball bats? _____

CALCULANDO EN METROS

Enlista por lo menos 5 cosas que midan casi un metro.

Enlista 5 cosas que midan más que un metro.

Enlista 5 cosas que midan menos que un metro.

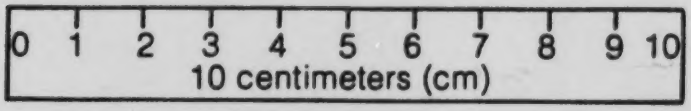
Trata de enlistar muchas cosas en cada columna.

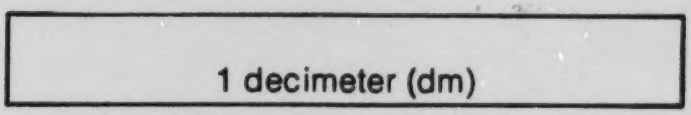
Menos que un metro	Casi un metro	Más que un metro
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

¿Cuántos lápices miden lo largo de un metro? _____

¿Cuántos creyones? _____ ¿Cuántos libros? _____

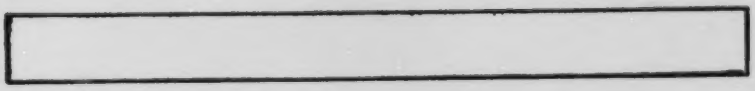
¿Cuántos clips? _____ ¿Cuántos bates de béisbol? _____

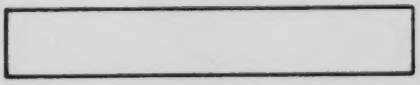


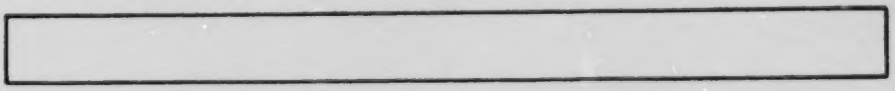


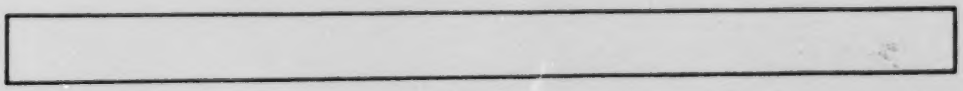
10 centimeters = 1 decimeter
10 cm = 1 dm

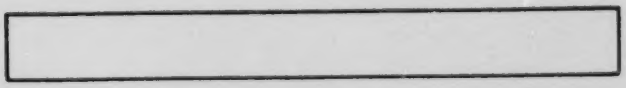
Measure the following bars with your ruler.
Color the bars that are longer than 1 decimeter.











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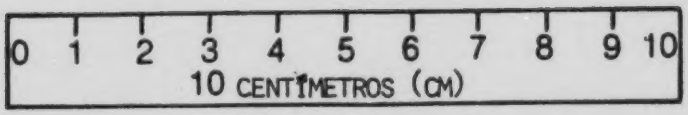
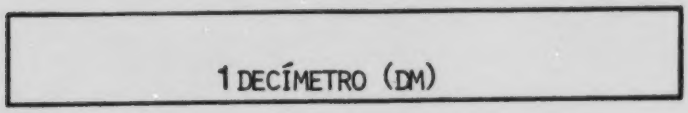
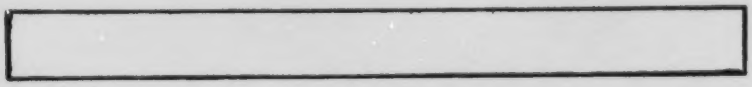
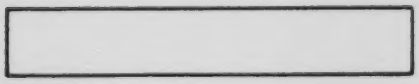


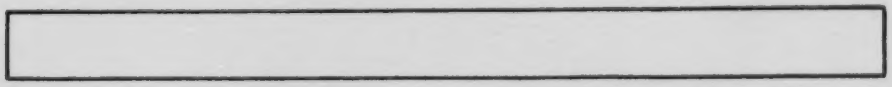


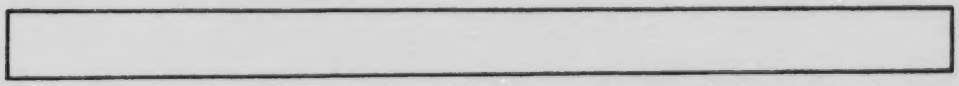
10 CENTÍMETROS = 1 DECÍMETRO
10 CM = 1 DM

Mide las barras con tu regla.
Colorea las barras que miden más de un decímetro de largo.









39

ESTIMATING WITH DECIMETERS

Using the colored strips, cut 10 (each a decimeter long) and paste them to a strip of tape. How long is the decimeter tape that you just made?
10 dm = _____.

Use your decimeter tape to measure several distances in the room to the nearest decimeter. Don't forget to estimate first.

ITEM	ESTIMATE	MEASURE
Width of desk	dm	dm
Length of desk	dm	dm
Length of book	dm	dm
Length of arm	dm	dm
Length of sink	dm	dm
Width of table	dm	dm

How many centimeters does it take to make a decimeter? _____

How many centimeters equal a meter? _____

CALCULANDO CON DECIMETROS

Corta 10 tiras de papel rojo de un decímetro de largo cada una y pégalas en papel de máquina calculadora. ¿Qué tan larga es la cinta que has hecho?
10 dm = _____.

Usa tu cinta de decímetros para medir algunas distancias en el salón en decímetros. No te olvides de calcular antes de empezar.

COSA	CALCULO	MEDIDA
El ancho del pupitre	dm	dm
Largo del pupitre		
Largo del libro		
Largo del brazo		
Largo del fregadero		
Ancho de la mesa		

¿Cuántos centímetros necesitas para hacer un decímetro? _____

¿Cuántos centímetros hay en un metro? _____

DECIMETERS

Measure an object.
Record how many decimeters long it is on scratch paper and let a friend find the object.
Record the length of each object on the chart.

OBJECT	How many decimeters?

DECIMETROS

Mide un objeto cualquiera en decímetros.
Apunta en una hoja de papel cuantos decímetros de largo tiene y dáselo a tu compañero para que encuentre el objeto.
Apunta la longitud de cada objeto en la tabla.

OBJETO	¿Cúantos Decímetros?

CENTIMETERS

Stretch as many ways as possible.
Have a friend help you measure the distance.
Record results on the chart below.
Look at the drawing.

STRETCH	No. of cm
Arm Stretch	
Hands High Stretch	
Leg Stretch	
Body Stretch	

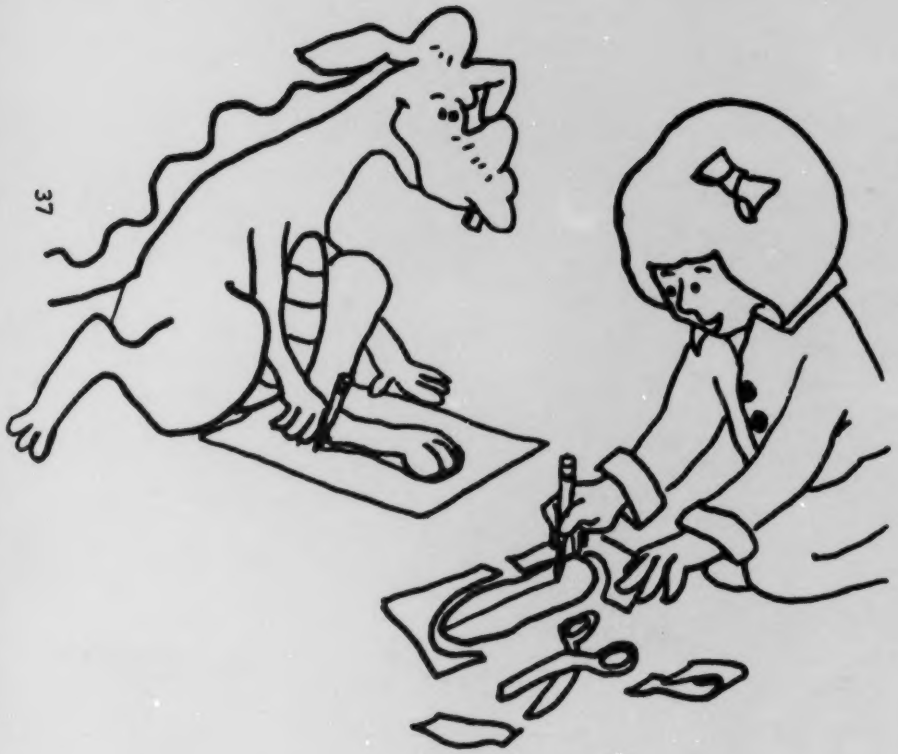
CENTIMETROS

Estírate en todas las formas que puedas.
Pídele a un amigo que te ayude a medir.
Apunta los resultados en la tabla.
Observa los dibujos.

EXTENSION AL ESTIRARSE	cm
Extensión al estirar los brazos	
Extensión al estirarse con las manos arriba	
Extensión al estirar las piernas	
Extensión al estirar el cuerpo	

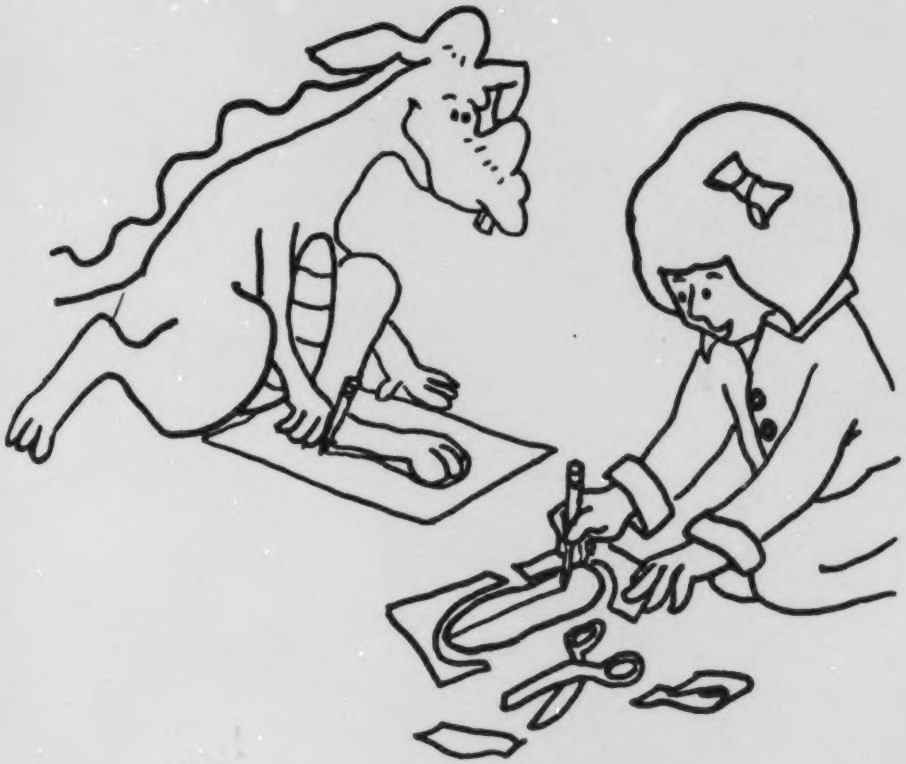
CENTIMETERS

Trace some body parts on a piece of paper that you can use to help you estimate. Cut them out, measure them and paste them on a paper for easy reference.



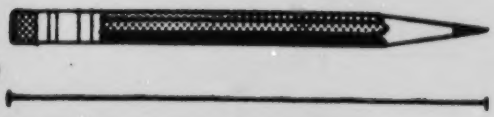
CENTIMETROS

Traza algunas partes del cuerpo en una hoja de papel para ayudarte a calcular.
Recórtalas, mídelas y pégalas en una hoja grande de papel.
Usa estas medidas para ayudarte a calcular.

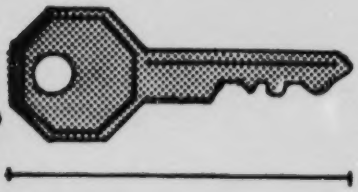


How long is each object?

Measure the object with a centimeter ruler.

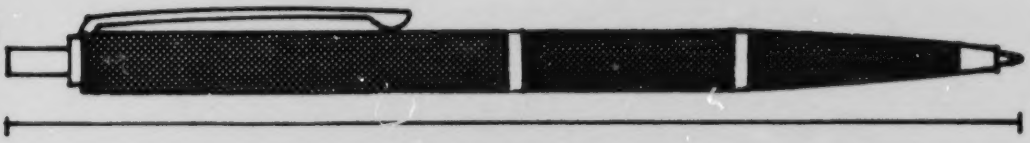


_____ cm

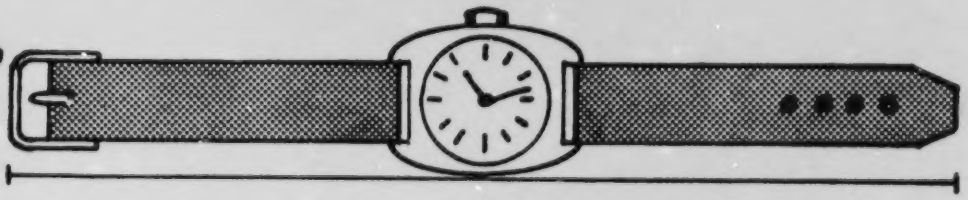


_____ cm

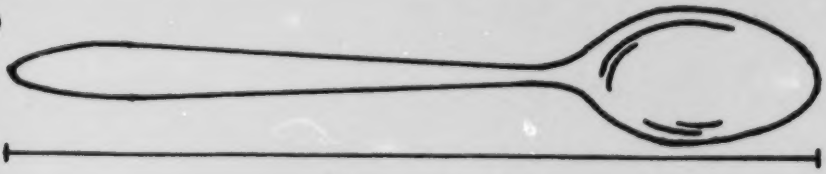
_____ cm



_____ cm



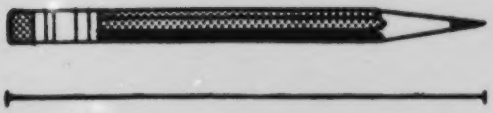
_____ cm



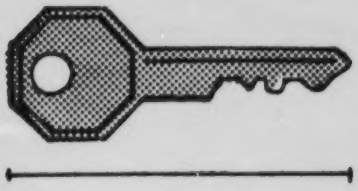
_____ cm

¿Cuánto mide de largo cada objeto?

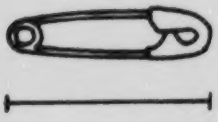
Usa tu regla para medir cada objeto.



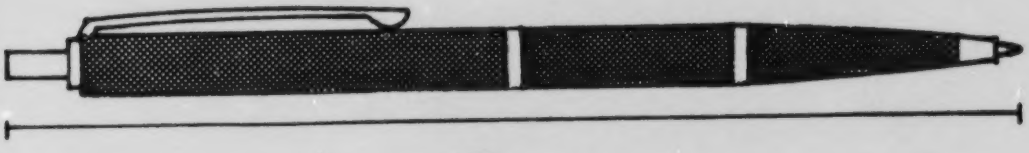
_____ cm



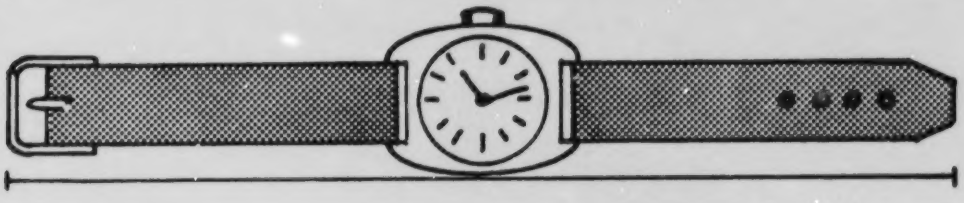
_____ cm



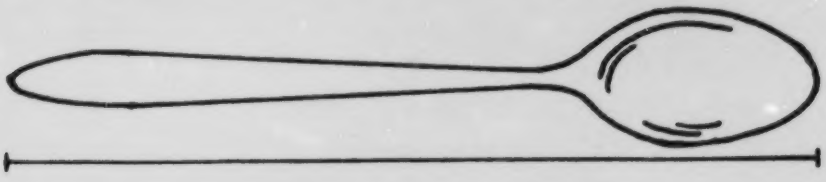
_____ cm



_____ cm



_____ cm



_____ cm

How long is each line?
Use your ruler to measure each line.

_____ cm

_____ cm

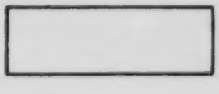
_____ cm

_____ cm

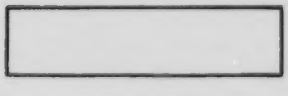
_____ cm

How long is each bar?
Use your ruler to measure each bar.

_____ cm



_____ cm

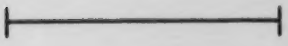


_____ cm

_____ cm

¿Cuánto mide de largo cada línea?
Usa tu regla para medir cada línea.

_____ cm



_____ cm

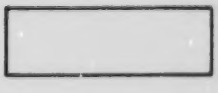
_____ cm

_____ cm

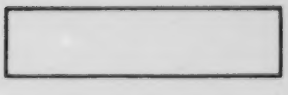
_____ cm

¿Cuánto mide de largo cada barra?
Usa tu regla para medir cada barra.

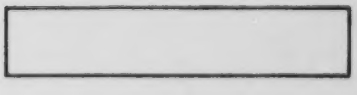
_____ cm



_____ cm



_____ cm



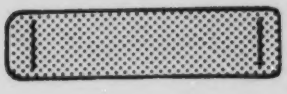
_____ cm

How long is each object?

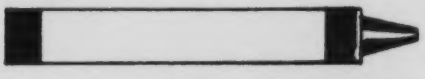
Measure the object with a centimeter ruler.

_____ cm

_____ cm

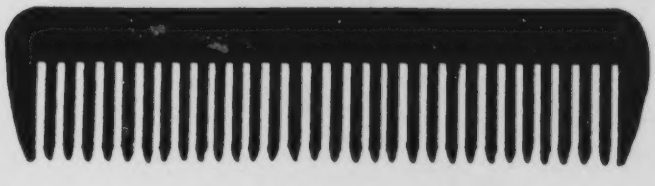


_____ cm



_____ cm

_____ cm



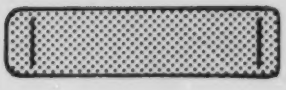
_____ cm

¿Cuánto mide de largo cada objeto?

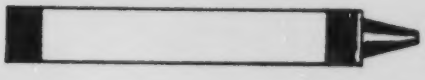
Mide cada objeto con tu regla.

_____ cm

_____ cm

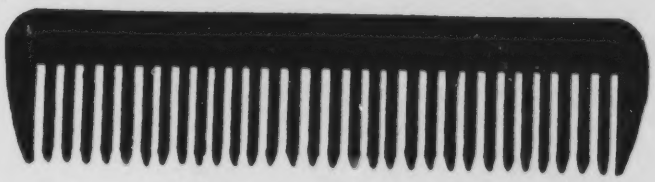


_____ cm



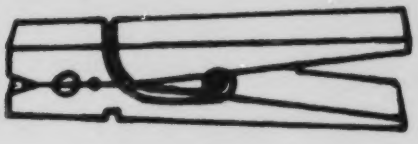
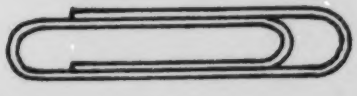
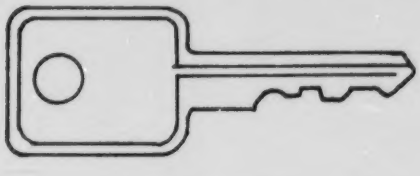
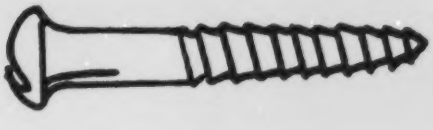
_____ cm

_____ cm

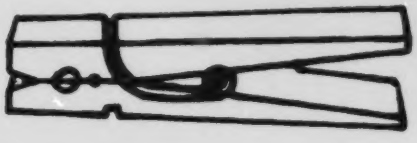
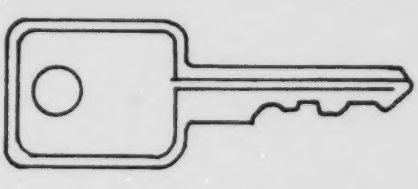
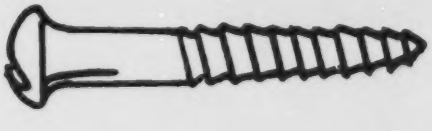


_____ cm

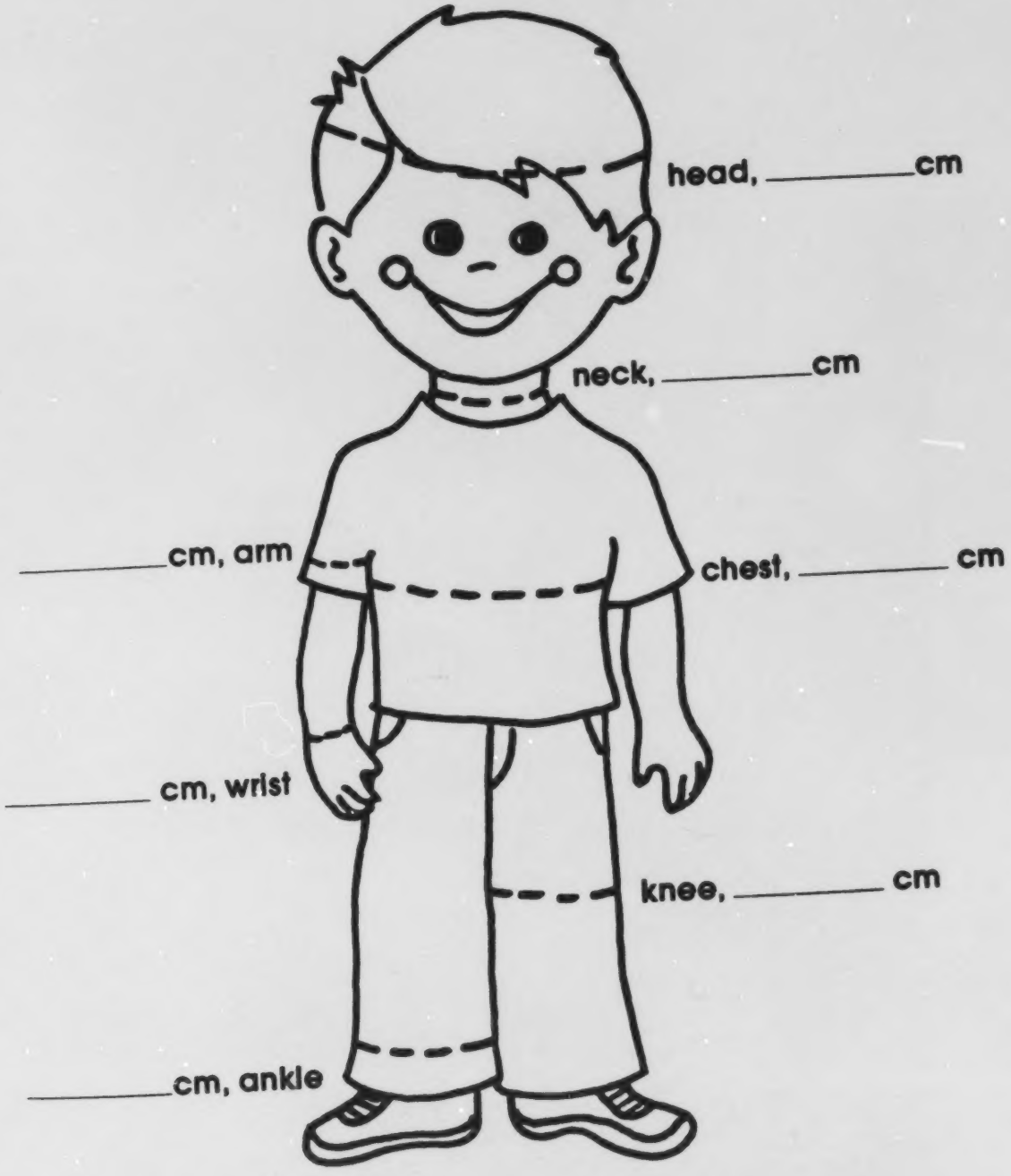
Guess how many centimeters long each object is. Write your guess. Then measure the object with a centimeter ruler. Write the measurement in the right column.

Object	Guess	Measurement
	____	____
	____	____
	____	____
	____	____
	____	____
	____	____

Cálcula en centímetros lo que mide de largo cada objeto. Escribe lo que cálculas primero y luego mide los objetos con tu regla.

OBJETO	CÁLCULO	MEDIDA
	____	____
	____	____
	____	____
	____	____
	____	____
	____	____

Do this activity with a friend. Use a metric tape measure to know your body measurements.



Has esta actividad con un amigo. Usa la cinta metrica para medir las partes de tu cuerpo.

CABEZA _____ cm

CUELLO _____ cm

_____ cm, BRAZO

PECHO _____ cm

_____ cm, MUÑECA

RODILLA _____ cm

_____ cm, TOBILLO

Metrics Measurement Exercise

My friend's measurements

_____ is _____ cm tall.
Name

His/Her arms are _____ cm long.

The distance around his/her waist is about _____cm.

The distance around his/her head is about _____cm.

Ejercicio de Medición

Las medidas de mi amigo(a)

_____ mide _____ cm de estatura.
Nombre

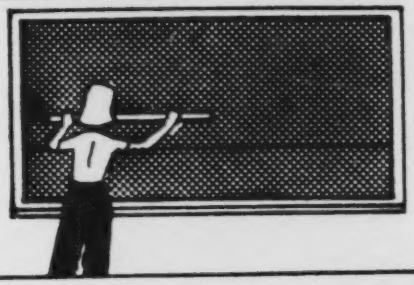
Sus brazos miden _____ cm de largo.

La medida de su cintura es de _____cm.

La medida de su cabeza es de _____cm.

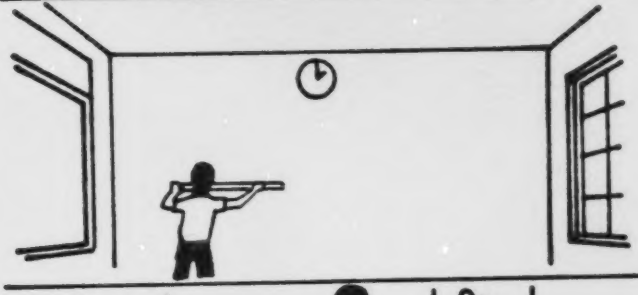
Measure the following objects in the classroom.

The objects are more than one meter long.



The blackboard is

_____m_____cm long.

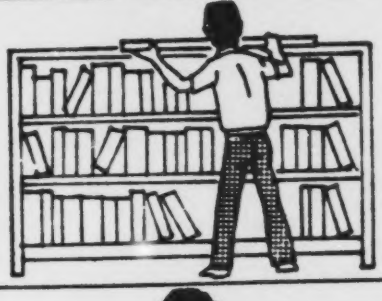


The wall is

_____m_____cm long.

The teacher's desk is

_____m_____cm long.



The bookcase is

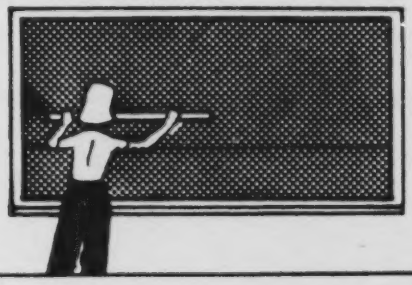
_____m_____cm long.

The table is

_____m_____cm long.

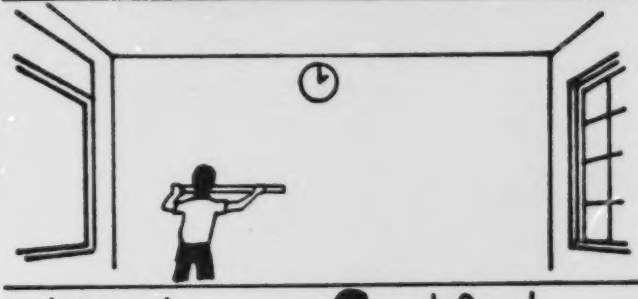
Mide los siguientes objetos en el salón.

Los objetos miden más que un metro.



El pizarrón mide

_____m _____cm de largo.



La pared mide

_____m _____cm de largo.

El escritorio del profesor mide

_____m _____cm de largo.

El librero mide

_____m _____cm de largo.

La mesa mide

_____m _____cm de largo.

ESTIMATING IN MILLIMETERS

A millimeter is used for measuring very small things. A dime is about 1 mm thick.

How many mm = 1 cm? _____

How many mm = 1 dm? _____

Estimate and measure the length and width of the following objects in mm:

OBJECT	LENGTH		WIDTH	
	ESTIMATE	MEASURE	ESTIMATE	MEASURE
Small postage stamp	mm	mm	mm	mm
Large postage stamp	mm	mm	mm	mm
Box for staples	mm	mm	mm	mm
Scotch tape package	mm	mm	mm	mm
Small paper clip	mm	mm	mm	mm
Large paper clip	mm	mm	mm	mm

CALCULANDO EN MILIMETROS

Un milímetro se usa para medir cosas muy pequeñas. Una moneda de diez centavos tiene 1 mm de espesor.

¿Cuántos mm = 1 cm? _____

¿Cuántos mm = 1 dm? _____

Calcula y mide lo largo y ancho de los siguientes objetos:

OBJETO	LARGO		ANCHO	
	CALCULADO	MEDIDO	CALCULADO	MEDIDO
Timbre postal pequeño	mm	mm	mm	mm
Timbre postal grande	mm	mm	mm	mm
Caja de grapas	mm	mm	mm	mm
Paquete de cinta scotch	mm	mm	mm	mm
Clip pequeño	mm	mm	mm	mm
Clip grande	mm	mm	mm	mm

Use the ruler to measure the following objects.

How many centimeters long is each object?

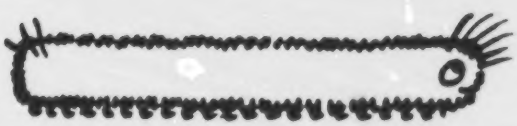
How many millimeters long?

_____ cm _____ mm

_____ cm _____ mm

_____ cm _____ mm

_____ cm _____ mm



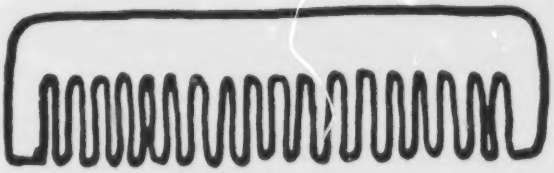
_____ cm _____ mm

_____ cm _____ mm

Usa tu regla para medir los siguientes objetos.
¿Cuántos centímetros mide de largo cada objeto?
¿Cuántos milímetros mide de largo cada objeto?

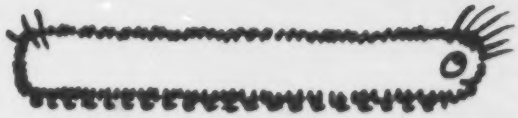
_____ cm _____ mm

_____ cm _____ mm



_____ cm _____ mm

_____ cm _____ mm



_____ cm _____ mm

_____ cm _____ mm

MEASURING WITH METERS

Use your meter to measure 10 meters.

How many normal steps do you take in 10 meters? _____

We can call a normal step a pace and use it to estimate longer distances.

How many paces do you take in 20 meters? _____

Complete the following chart:

METERS	PACES	METERS	PACES
30 m	paces	70 m	paces
40 m	paces	90 m	paces
60 m	paces	100 m	paces

How can you estimate the distance from your house to your friend's house without using a meter stick? _____

The distance from my front door to _____'s front door is _____m.

The distance from my classroom to room _____ is _____m.

The distance around the school is _____m.

The distance around the playground is _____m.

MIDIENDO CON METROS

Usa el metro para medir 10 metros.

¿Cuántos pasos normales hay en 10 metros? _____

Podemos nombrar un paso normal como un paso y usarlo para calcular distancias más largas.

¿Cuántos pasos hay en 20 metros?_____

Completa la siguiente tabla:

METROS	PASOS	METROS	PASOS
30 m	pasos	70 m	pasos
40 m	pasos	90 m	pasos
60 m	pasos	100 m	pasos

¿Cómo puedes calcular la distancia de t casa a la casa de tu amigo sin usar el metro? _____

La distancia de mi puerta a la puerta de _____ es _____m.

La distancia de mi salón al salón _____ es _____m.

La distancia alrededor la escuela es _____m.

La distancia alrededor del patio donde juegas es _____m.

1 km = 1000 m

A city block is about 100 meters long.

A kilometer is about _____ city blocks long.

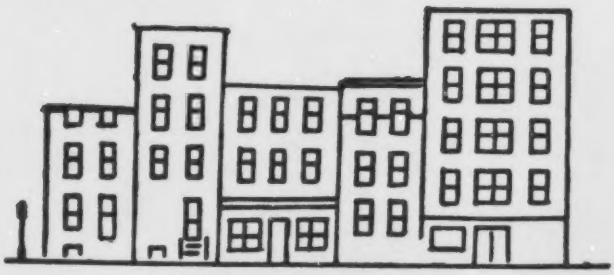
1 km = 1000 m

Fill in the blanks:

1 km = _____ m	1000 m = _____ km
5 km = _____ m	3000 m = _____ km
9 km = _____ m	7000 m = _____ km
43 km = _____ m	5000 m = _____ km
78 km = _____ m	12000 m = _____ km
90 km = _____ m	28000 m = _____ km
83 km = _____ m	50000 m = _____ km

1 km = 1000 m

Una cuadra de la ciudad mide aproximadamente 100 metros de largo.



Un kilómetro es casi _____ cuadras de la ciudad.

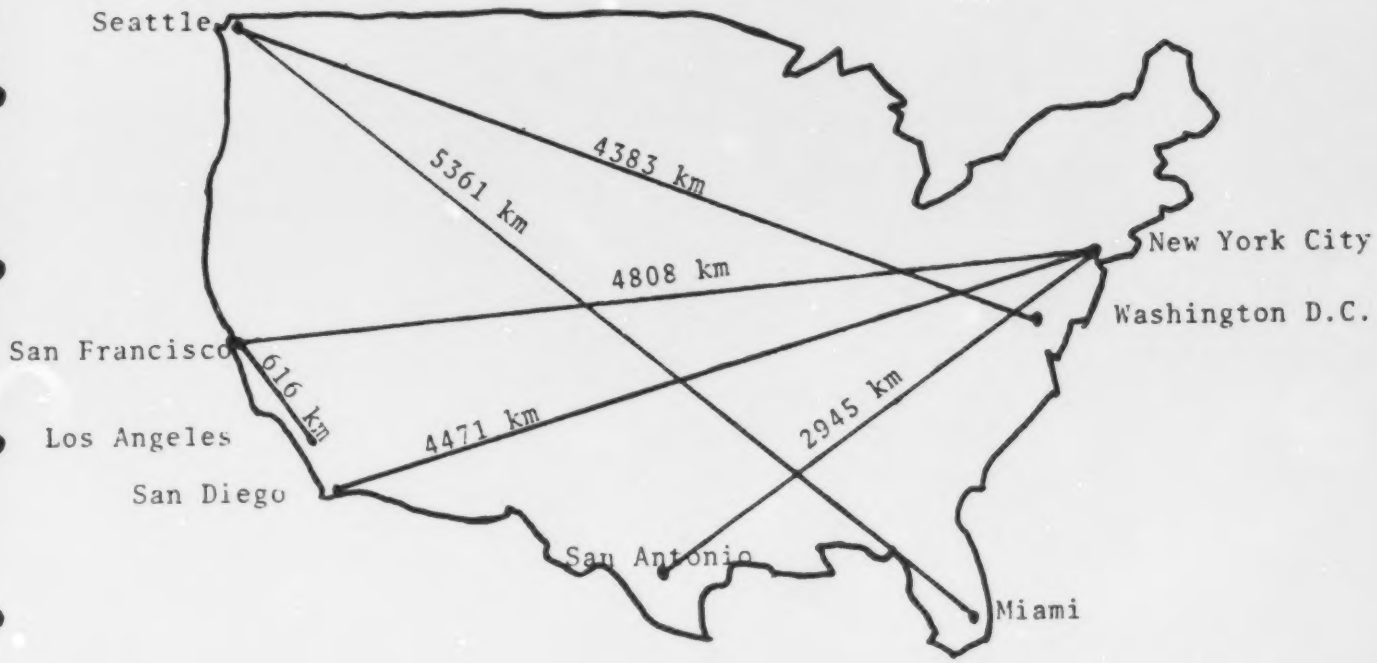
1 km = 1000 m

Llena los espacios en blanco.

1 km = _____ m	1000 m = _____ km
5 km = _____ m	3000 m = _____ km
9 km = _____ m	7000 m = _____ km
43 km = _____ m	5000 m = _____ km
78 km = _____ m	12000 m = _____ km
90 km = _____ m	28000 m = _____ km
83 km = _____ m	50000 m = _____ km

Kilometers (km) are used to measure long distances. One kilometer equals 1000 meters (1km = 1000 m).

The map below shows the distances in kilometers between cities.



Use the map to find the distances between the following cities.

New York and San Francisco _____ km

New York and San Diego _____ km

San Antonio and New York _____ km

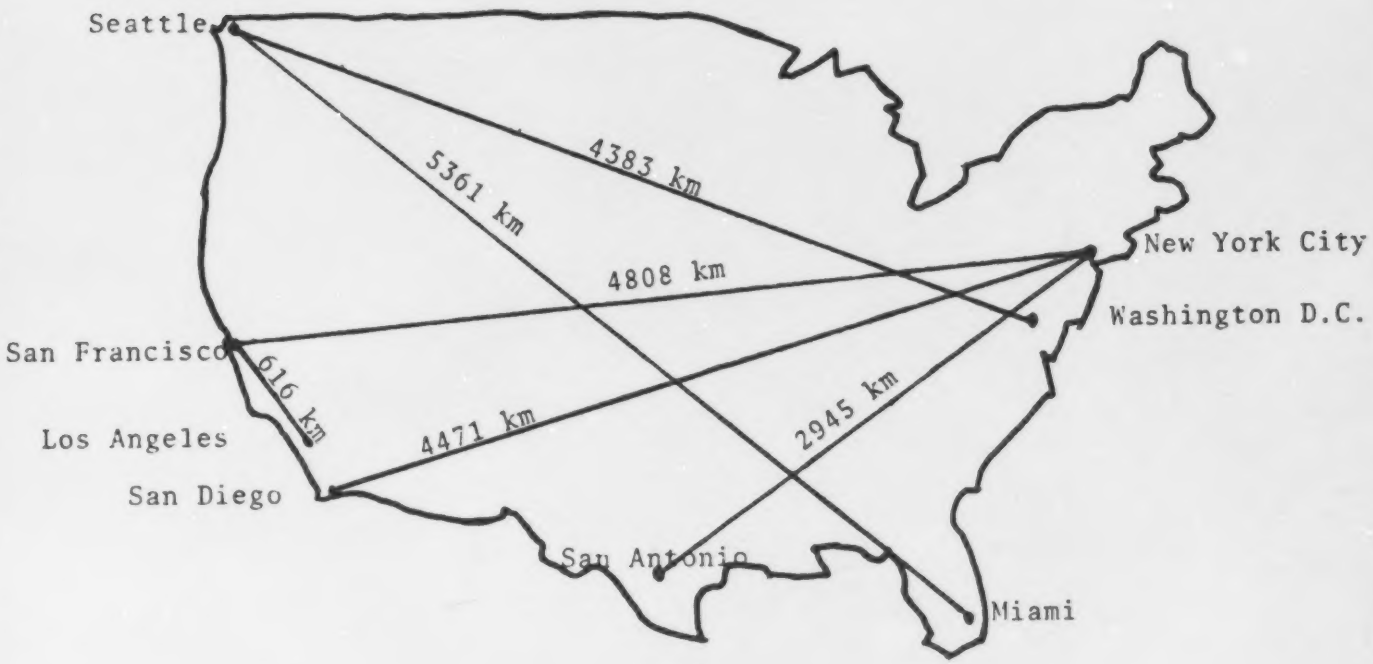
Seattle and Miami _____ km

Washington, D.C. and Seattle _____ km

Los Angeles and San Francisco _____ km

El kilómetro (km) se usa para medir distancias muy largas. Un kilómetro es igual a 1000 metros (1 km = 1000 m).

El mapa abajo representa la distancia en kilómetros entre algunas ciudades.



Encuentra en el mapa las distancias entre las siguientes ciudades.

New York y San Francisco _____ km

New York y San Diego _____ km

San Antonio y New York _____ km

Seattle y Miami _____ km

Washington, D.C. y Seattle _____ km

Los Angeles y San Francisco _____ km

Draw a line from each number to the prefixes that each applies to.

77

Dibuja una línea que corresponda al número con el prefijo.

78

To multiply a whole number by 10, add a zero to the number.

7 x 10 = 70 8 x 10 = 80

Solve the following equations.

3 x 10 = _____ 15 x 10 = _____

8 x 10 = _____ 37 X 10 = _____

60 x 10 = _____ 61 x 10 = _____

24 x 10 = _____ 28 x 10 = _____

19 x 10 = _____ 94 x 10 = _____

7 x 10 = _____ 36 x 10 = _____

To convert centimeters to millimeters, multiply by 10.

1 cm = 10 mm 5.3 cm = 53 mm

Fill in the blank.

4 cm = _____ mm 90 cm = _____ mm

3.1 cm = _____ mm 54 cm = _____ mm

8 cm = _____ mm 26 cm = _____ mm

2 cm = _____ mm 81 cm = _____ mm

7 cm = _____ mm 57 cm = _____ mm

3 cm = _____ mm 63 cm = _____ mm

Para multiplicar un número cutero por 10, agrega un cero al número.

7 x 10 = 70 8 x 10 = 80

Efectúa las siguientes operaciones.

3 x 10 = _____ 15 x 10 = _____

8 x 10 = _____ 37 x 10 = _____

6 x 10 = _____ 61 x 10 = _____

24 x 10 = _____ 28 x 10 = _____

19 x 10 = _____ 94 x 10 = _____

7 x 10 = _____ 36 x 10 = _____

Para convertir centímetros a milímetros, multiplica por 10.

1 cm = 10 mm 5.3 cm = 53 mm

Llena los espacios en blanco.

4 cm = _____ mm 90 cm = _____ mm

3.1 cm = _____ mm 54 cm = _____ mm

8 cm = _____ mm 26 cm = _____ mm

2 cm = _____ mm 81 cm = _____ mm

7 cm = _____ mm 57 cm = _____ mm

3 cm = _____ mm 63 cm = _____ mm

Convert the following measurements.

1 cm = 10 mm

Fill in the blanks.

1 cm = _____ mm

4 cm = _____ mm

7 cm = _____ mm

1 cm 5 mm = _____ mm

6 cm 8 mm = _____ mm

3 cm 6 mm = _____ mm

40 mm = _____ cm

20 mm = _____ cm

30 mm = _____ cm

53 mm = _____cm _____mm

35 mm = _____cm _____mm

48 mm = _____cm _____mm

Match the lengths that are equal.

100 mm	13 cm	4 cm 4 mm	72 mm
70 mm	7 cm	5 cm 2 mm	23 mm
50 mm	10 cm	7 cm 2 mm	44 mm
120 mm	16 cm	5 cm 3 mm	52 mm
130 mm	12 cm	2 cm 3 mm	82 mm
160 mm	5 cm	8 cm 2 mm	53 mm

Convierta las siguientes medidas.

1 cm = 10 mm

Llena el espacio en blanco.

1 cm = _____ mm

4 cm = _____ mm

7 cm = _____ mm

1 cm 5 mm = _____ mm

6 cm 8 mm = _____ mm

3 cm 6 mm = _____ mm

40 mm = _____ cm

20 mm = _____ cm

30 mm = _____ cm

53 mm = _____ cm _____ mm

35 mm = _____ cm _____ mm

48 mm = _____ cm _____ mm

Coteja las longitudes que son iguales.

100 mm	13 cm	4 cm 4 mm	72 mm
70 mm	7 cm	5 cm 2 mm	23 mm
50 mm	10 cm	7 cm 2 mm	44 mm
120 mm	16 cm	5 cm 3 mm	52 mm
130 mm	12 cm	2 cm 3 mm	82 mm
160 mm	5 cm	8 cm 2 mm	53 mm

To divide a number by 10, move the decimal point one place to the left.

50.0 ÷ 10 = 5 8.0 ÷ 10 = .8 = 0.8

Solve the following equations.

3.0 ÷ 10 = _____ 15.0 ÷ 10 = _____

80.0 ÷ 10 = _____ 32.0 ÷ 10 = _____

4.0 ÷ 10 = _____ 6.3 ÷ 10 = _____

73.0 ÷ 10 = _____ 48.7 ÷ 10 = _____

65.0 ÷ 10 = _____ 13.0 ÷ 10 = _____

3.8 ÷ 10 = _____ 23.0 ÷ 10 = _____

To convert millimeters to centimeters, divide by 10.

1 mm ÷ 0.1 cm 3.6 mm = 0.36 cm

Fill in the blank.

3.0 mm = _____ cm 2.3 mm = _____ cm

8.1 mm = _____ cm 98.0 mm = _____ cm

70.0 mm = _____ cm 3.8 mm = _____ cm

.8 mm = _____ cm 10.2 mm = _____ cm

7.3 mm = _____ cm 28.2 mm = _____ cm

6.4 mm = _____ cm 20.5 mm = _____ cm

Para dividir un número por 10, mueva el punto decimal un lugar a la izquierda.

50.0 ÷ 10 = 5 8.0 ÷ 10 = .8 = 0.8

Efectúa las siguientes operaciones.

3.0 ÷ 10 = _____ 15.0 ÷ 10 = _____

80.0 ÷ 10 = _____ 32.0 ÷ 10 = _____

4.0 ÷ 10 = _____ 6.3 ÷ 10 = _____

73.0 ÷ 10 = _____ 48.7 ÷ 10 = _____

65.0 ÷ 10 = _____ 13.0 ÷ 10 = _____

3.8 ÷ 10 = _____ 23.0 ÷ 10 = _____

Para convertir milímetros a centímetros, divide por 10.

1 mm = 0.1 cm 3.6 mm = 0.36 cm

Llena los espacios en blanco.

3.0 mm = _____ cm 2.3 mm = _____ cm

8.1 mm = _____ cm 98.0 mm = _____ cm

70.0 mm = _____ cm 3.8 mm = _____ cm

.8 mm = _____ cm 10.2 mm = _____ cm

7.3 mm = _____ cm 28.2 mm = _____ cm

6.4 mm = _____ cm 20.5 mm = _____ cm

Convert to the indicated units.

Solved problems

243 cm = 2.43 m

2724 m = 2.724 km

4372 m	= _____	km	24153 cm	= _____	m
2712 m	= _____	km	4732 cm	= _____	m
3699 m	= _____	km	724 cm	= _____	m
378 m	= _____	km	2714 mm	= _____	m
4732 m	= _____	km	3700 mm	= _____	m
4392 m	= _____	km	705 mm	= _____	m
672 m	= _____	dam	273 mm	= _____	cm
98 m	= _____	km	1513 mm	= _____	dm
275 m	= _____	km	43 cm	= _____	dm
34 dm	= _____	m	273 cm	= _____	dm
983 dm	= _____	m	7245 mm	= _____	m
73 dm	= _____	m	5 dm	= _____	m
429 cm	= _____	m	875 cm	= _____	m
324.3 cm	= _____	m	1512.2 cm	= _____	m
43 cm	= _____	m	7 cm	= _____	m
2915 mm	= _____	m	4321.5 mm	= _____	m

Convierte a las unidades que se indican.

Ejemplos resueltos

243 cm = 2.43 m

2724 m = 2.724 km

4372 m = _____ km

2712 m = _____ km

3699 m = _____ km

378 m = _____ km

4732 m = _____ km

4392 m = _____ km

672 m = _____ dam

98 m = _____ km

275 m = _____ km

34 dm = _____ m

983 dm = _____ m

73 dm = _____ m

429 cm = _____ m

324.3 cm = _____ m

43 cm = _____ m

2915 mm = _____ m

24153 cm = _____ m

4732 cm = _____ m

724 cm = _____ m

2714 mm = _____ m

3700 mm = _____ m

705 mm = _____ m

273 mm = _____ cm

1513 mm = _____ dm

43 cm = _____ dm

273 cm = _____ dm

7245 mm = _____ m

5 dm = _____ m

875 cm = _____ m

1512.2 cm = _____ m

7 cm = _____ m

4321.5 mm = _____ m

There is a shorter way to write the units of measurement. They are called symbols.

The symbols for the units of measure for length are:

millimeter - mm
centimeter - cm
decimeter - dm
meter - m
dekameter - dam
hectometer - hm
kilometer - km

Meter is the basic unit for measuring length or distance.

MILLI means 1/1000.	DEKA means 10.
CENTI means 1/100.	HECTO means 100.
DECI means 1/10.	KILO means 1000.

10 DECImeters equals 1 meter.
100 CENTImeters equals 1 meter.
1000 MILLImeters equals 1 meter.

1 DEKAMETER equals 10 meters.
1 HECTOMETER equals 100 meters.
1 KILOMETER equals 1000 meters.

Existe una forma más corta de escribir las unidades de medición y se les llama <u>símbolos</u>.

Los símbolos de las unidades de medición de longitud son:

milímetro - mm
centímetro - cm
decímetro - cm
metro - m
decámetro - dam
hectómetro - hm
kilómetro - km

Metro es la unidad básica para medir longitud o distancias.

MILI significa 1/1000.
CENTI significa 1/100.
DECI significa 1/10.

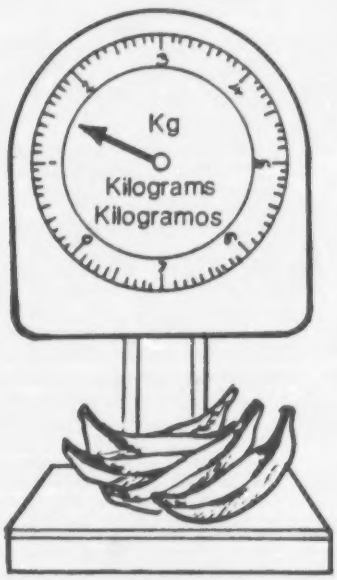
DECA significa 10.
HECTO significa 100.
KILO significa 1000.

10 DECImetros igual a 1 metro.
100 CENTImetros igual a 1 metro.
1000 MILImetros igual a 1 metro.

1 DECAMETRO igual a 10 metros.
1 HECTOMETRO igual a 100 metros.
1 KILOMETRO igual a 1000 metros.

RESOURCE UNIT
(Unidad de Trabajo)

GRAM: a standard unit of weight/mass
(GRAMO: unidad estandard de peso/masa)



Dr. Josefina Pulido **Simón Almendares**

I. TITLE: Gram: A Standard Unit Of Weight

II. General Objectives

A. Knowledge and Concepts

1. To develop in the children, knowledge and understanding of:

a. The concept of weight/mass.

b. The gram as standard unit of weight/mass.

c. The concept of gram, decigram, centigram and milligram.

d. The concept of dekagram, hectogram and kilogram.

e. When to appropriately use the gram, decigram, centigram, milligram, dekagram, hectogram, and kilogram.

f. The process of converting big metric units to smaller units or smaller units to bigger units.

2. To aquaint the children with real life situations or problems that call for measurement skills.

B. Skills

To develop in children, the ability to:

a. Identify the gram and its smaller and bigger units.

b. Use appropriately different units of weight/mass.

c. Use different kinds of measuring instruments.

d. Solve problems involving the use of measuring weight/mass.

C. Attitudes

To develop in the children:

a. An appreciation of the importance of the knowledge of and skills in weighing.

b. The feeling that the measurement by using the metric system is easy.

c. The importance of accuracy in weighing.

III. Content Outline

A. What is weight/mass?
What is the standard unit to weigh?

B. The decigram, centigram, milligram.

C. The dekagram, hectogram, kilogram.

D. Manipulating the scales to use the gram, decigram, centigram, and milligram.

E. Manipulating different scales to use the dekagram, hectogram, and kilogram.

F. Converting smaller units into bigger units or vice versa.

G. Problem solving.

IV. Initiating the unit

Initiating the unit - some suggestions:

1. Start a conversation with the class asking the children if they have had an experience of weighing light things or heavy things and if they know how to use the scales and the instruments.

2. Structure the room with pictures relating to the ways different scales are used. Relate these to the new unit.

3. Introduce the new unit directly. Encourage children to raise questions they would like answered about measuring weight and using the scales. Write all the questions on the board.

4. Take the children to a place outside of the classroom where there are things that can be weighed and where the students can see somebody manipulating the instruments to weigh. Ex.: meat store, grocery store, etc.

INSTRUCTIONAL ACTIVITIES

LESSON 1

Objectives: After the lesson, the children will be able to:

A. Identify objects that can be weighed.

B. Identify the gram as the basic unit of weight.

C. Tell in simple terms what the word "weight" or "mass" means.

D. Identify the simple scales or balances.

E. Manipulate the scales or the balance weighing objects that are almost a gram.

Materials needed

. Pictures
. Pencils
. A scale and a balance scale
. Several 1 gram weights (masses)
. Classroom objects
. Colored pens

Activities Measuring Weight

A. Children will be given an object in each hand. They will compare the two and place the heavier item to the left and the lighter one to the right.

B. Put two children together and ask the rest of the class which of the two children is heavier.

C. Write on the blackboard the word gram and its symbol g. Pronounce the word gram and explain that g is a short way to write the word gram. Show the 1 gram weight/mass and introduce it as a "standard" unit of measuring weight.

D. Have children balance different objects placed in the pans of a balance scale. It does not matter if the objects are light or heavy.

E. Give children two objects that are the same weight (crackers) and tell them that both objects have the same mass. Mass means how much "stuff" there is in an object.

F. Ask the children to find some objects that weigh less than a

gram, some that weigh about a gram and some that weigh more than a gram.

G. Ask the children to estimate the weight of some objects in the room and then to actually weigh the object and to compare the estimates with the actual weights.

H. Explain to the children that the gram unit is used to weigh light things.

LESSON 2

Objectives: After the lesson, the children will be able to:

A. Identify the measuring weights/masses such as: Decigram, centigram and milligram.

B. Identify and name the symbols of the gram, decigram, centigram and milligram. And tell the symbols.

C. Manipulate the measuring weights (gram, decigram, centigram, and milligram), the scales and weighing balances.

D. Identify situations where one can use these measuring weights.

Materials needed

. 2 Scales
. 2 Balance scales
. Measuring weights/masses
  6 gram weights/masses
  6 decigram weights/masses
  6 centigram weights/masses
  6 milligram weights/masses
. Worksheets
. Different objects to be weighed.

Activities

A. Recall the prefixes to indicate measures derived from standard measures. For example:

meter { DECImeter, CENTImeter, MILLImeter }

Ask the children to try to construct a similar chart for weight using the gram as a standard unit.

B. Ask the children to identify the different measuring weights/masses indicated in the chart.

C. Show the children the symbol for gram and let them deduce what the symbols are for the smaller units.

D. Show the children how to use the scales and the balance scale and how to weigh different things.

E. Mention actual situations where weighing things is necessary and let the children suggest what appropriate measuring unit to use.

F. Give exercises in estimating weight and let the children compare with actual weights.

G. Show the children how to find out their weight.

NOTE: Proceed in the same manner in developing the concepts: DEKAGRAM, HECTOGRAM, KILOGRAM.

LESSON 3

Objectives

Children will be able to solve problems that involve conversion from smaller units to bigger units or vice versa.

Materials needed

. Flash cards
. Mathematical problems

Activities

A. Give a flash card drill on the short method of dividing and multiplying by tens, hundres, and thousands.

B. Present several problems that call for the process of conversion. Solve them cooperatively. For example, Juan has 50 grams of candies and Pedro has 10 decigrams. Who has more candies?

C. Give conversion exercises:

3 g = _____ cg		4,000 g = _____ kg	
7 dg = _____ cg		8,000 g = _____ dag	
6 kg = _____ g		1,000 mg = _____ g	
5 dag = _____ mg		13,000 dg = _____ kg	
4 cg = _____ mg		300 cg = _____ dg	

ACTIVITIES

ACTIVIDADES

WEIGHT/MASS

PESO/MASA

WEIGHT ACTIVITY

Materials Needed

. Cans, boxes, etc. labeled 1, 1h, 2, 2h, etc.
. Blindfold

Activities

A. Students will in turn be blindfolded and given an item in each hand.

B. Students will compare the two and place the heavier item to the left and the lighter item to the right.

C. Activity will continue until the child has sorted the available boxes and cans.

D. Students will take off blindfold and check their answers by looking at the labels (heavier items will have an h).

ACTIVIDAD DE PESO

Materiales

. Latas vacias, cajas vacias, etc., marcadas con una etiqueta 1, 1p, 2, 2p, etc.

Actividad

A. A cada estudiante según le valla tocando su turno se le bendarán los ojos y se le dará un objeto en cada mano.

B. El estudiante comparará cual de los 2 objetos es más pesado y los colocará de la siguiente manera el más pesado al lado izquierdo y el más liviano en el lado derecho.

C. La actividad continuará hasta que el estudiante ha comparado todos los objetos.

D. Se le quitará la benda de los ojos a cada estudiante para que compruebe de acuerdo a la etiqueta marcada en los objetos, el peso correcto. Los objetos más pesados estarán marcados con una "p".

WEIGHT ACTIVITY

Materials Needed

- Balance Scale
- Playdough

Activities

A. Children will be shown 2 balls of playdough having equal weight. They will be allowed to hold one ball in each hand, and will then be shown, by use of a balance scale, that the weight is indeed equal.

B. The children will take one ball and flatten it into a pancake, roll it into a cigar, fold it into a "taco", etc. Each time the children will be asked if the mass has changed or is still the same.

C. Children hopefully will realize that the mass is the same because no playdough has been added or removed.

ACTIVIDAD DE PESO

Materiales

. Balanza en gramos
. Plastilina

Actividades

A. Se les dará a los estudiantes dos bolitas de plastilina que tengan el mismo peso. Se les permitirá tomar una bola en cada mano y luego se les mostrará la balanza y se usará para comprobar que el peso de cada bola es exactamente igual.

B. La forma de una bola será combiada a la de una tortilla o a la de un cigarro, etc. y cada que se haga el cambio de forma se le preguntará al estudiante si el peso ha cambiado o si es el mismo.

C. Los estudiantes se darán cuenta que el peso es el mismo ya que no se ha aumentado o disminuído la cantidad de plastilina.

USE OF BALANCE SCALE

Balance several objects with playdough using the balance scale.

Balance
or
Scale

Draw a picture of a scale where there is not enough playdough.

Draw a picture of a scale where there is too much playdough.

EL USO DE LA BASCULA

Usa la báscula para balancear algunas cosas con plastilina.

Balanza
o
Báscula

Dibuja una báscula donde no hay bastante plastilina.

Dibuja una báscula donde hay demasiada plastilina.

WEIGHT ACTIVITY

Materials Needed

- Balance scale
- Graham crackers

Activity

A. Two graham crackers of equivalent weight will be placed in the pans of a balance scale.

B. Students will agree that the two crackers have the same weight.

C. One of the crackers will then be broken into pieces.

D. Children will be asked if the crackers have the same weight.

ACTIVIDAD DE PESO

Material

. Balanza en gramos
. Galletas

Actividad

A. Tomar 2 galletas del mismo peso. Colocar una a cada lado de la balanza.

B. Mostrarles a los estudiantes que las galletas tienen el mismo peso, y preguntarles si están de acuerdo.

C. Una de las galletas colocadas en la balanza se romperá en varios pedazos.

D. Se les preguntará a los estudiantes si las galletas tienen aún el mismo peso.

WEIGHT ACTIVITY

Materials Needed

- Balance scale
- Plastic airplanes
- Plastic cars
- Primary Scissors
- Large crayon
- Worksheets

Activity

A. Students will be given an explanation of how to measure the weight of an object with non-standard units by placing one object in one pan of the scale and placing the non-standard units in the other pan, counting each unit.

B. Students will be using plastic toys such as: airplanes, and cars as the non-standard units. Objects from the room will be weighed.

C. Students will estimate the number of units needed to balance the scale.

D. After measuring the weight of each object, students will record their measurements on the worksheet.

ACTIVIDAD DE PESO

Material

. Avioncitos de plástico
. Carritos de plástico
. Tijeras chicas
. Crayones grandes
. Hojas de papel

Actividad

A. Se les explicará a los estudiantes como se puede encontrar el peso de un objeto sin usar unidades estandards. Se pone el objeto a pesar en un lado de la balanza y del otro lado el objeto que servirá de unidad. Luego se cuenta en que proporción se equilibra la balanza.

B. Se les darán a los estudiantes juguetes de plástico como avioncitos, carritos etc. que servirán como unidades. Y se pesarán algunos objetos del salón.

C. Los estudiantes calcularán el número de unidades que se necesitan para equilibrar la balanza.

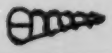
D. Después de saber el peso de cada objeto, los estudiantes reportarán sus resultados en las hojas de papel.

Non-Standard Units

. Choose an object and put it on the scale. Guess how many wooden blocks will balance the scale.

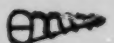
. Record your estimate. Now check to see if the estimate is correct by counting the actual number of wooden blocks needed to balance the scale.

. Continue with the marbles and screws.

OBJECT						
	ESTIMATE	MEASURE	ESTIMATE	MEASURE	ESTIMATE	MEASURE

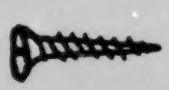
UNIDADES ARBITRARIAS

- Toma un objeto y ponlo en la báscula. Adivina cuantos dados se necesitan para mantener la báscula en balance.
- Apunta lo estimado. Comprueba si lo estimado está correcto, contando el número real de dados que se necesitan para mantener la báscula en balance.
- Continua con las canicas y los tornillos.

OBJETO						
	Número Estimado	Número Exacto	Número Estimado	Número Exacto	Número Estimado	Número Exacto

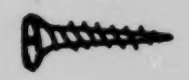
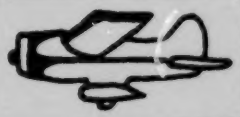
APPROPRIATE UNIT

Put a checkmark in the column for the unit that is the best to use for finding the weight of the following objects.

OBJECT		

UNIDAD MAS APPROPRIADA

Pon un X en la columna que representa la unidad que es más apropiada para encontrar el peso de los siguientes objetos.

OBJETO		

GRAM

Materials Needed

- Balance scale
- Gram masses
- Large crayon
- Primary scissors
- Blackboard eraser
- 2 Pens
- Worksheets

Activities

A. Students will collect light objects from the room to be weighed.

B. Students will be told that a candy corn or 1 standard paper clip has a weight of one gram; this may be used as a frame of reference for their estimations.

C. Students will choose objects from the room which have a weight of less than 50 g to estimate their weight, then record the estimates on the worksheet.

D. Students will use the balance to measure the weight of the objects in grams, then record the exact measure on the worksheet.

E. Have students write the symbol for gram (g) after the number.

F. Review correct placement of objects and masses on scale. Remind children that they should be at eye level when ckecking the needle for balance.

G. Remind students of the existance of smaller units than a gram and the appropriate use. Teach them the names and the symbols of these smaller units.

H. Students should also be informed that 1000 grams are equivalent to 1 kilogram.

ACTIVIDAD GRAMO

Material

- Balanza en gramos
- Pesas en gramos
- Crayones
- Tijeras
- Borrador de pizarrón
- 2 Plumas
- Hojas de papel

Actividades

A. Pedir a los estudiantes que reunan varios objetos livianos del salón.

B. Mostrarles a los estudiantes que 1 clip tamaño estandard pesa casi un gramo así que esto les puede servir como referencia para poder calcular.

C. Los estudiantes reunirán objetos del salón que pesen menos de 50 gramos para así poder adivinar el peso de cada objeto y luego apuntarán el peso en una hoja de papel.

D. Los estudiantes pesarán los objetos en la balanza usando los pesos en gramos. Encontrarán el peso exacto y lo apuntarán en las hojas de papel.

E. Pedirles a los estudiantes que escriban el símbolo del gramo (g) después del número.

F. Asegurar que los objetos y las pesas de la báscula se encuentren en los lugares indicados. Recuérdeles a los estudiantes que la aguja de la balanza debe checarse al nivel de los ojos.

G. Mencione a los estudiantes que existen unidades más pequeñas y que se utilizan para pesar cosas diminutas. Se les puede enseñar como se llaman y como escribir sus símbolos.

H. Se les debe informar a los estudiantes que 1000 gramos equivalen a 1 kilogramo.

NAME _____ DATE _____

GRAMS

Choose several light objects from the room and list them on the worksheet. Estimate the weight in grams, then measure on the balance scale.

Record the weight of each object on the chart below.

OBJECT	ESTIMATE OF GRAMS	NUMBER OF GRAMS
Large crayons		
Scissors		
Blackboard eraser		
2 Pens		
10 Sheets of paper		

NOMBRE _____ FECHA _____

GRAMO

Selecciona algunos objetos livianos del salón y enlístalos en una hoja de papel. Adivina el peso en gramos y luego comprueba el peso exacto usando la báscula.

Apunta el peso de cada objeto en la tabla.

OBJETO	PESO CALCULADO EN GRAMOS	PESO EXACTO EN GRAMOS
Crayón grande		
Tijeras		
Borrador de pizarrón		
2 Plumas		
10 Hojas de papel		

ACTIVITY

GRAM

Materials Needed

- Balance scale
- Gram masses
- Large crayon
- Primary scissors
- Cork
- Soap
- Baby food jar
- Orange rod
- Chalk
- Marking pen
- Worksheets

Activity

A. Students will review frames of reference for the gram such as 1 standard paper clip or candy corn.

B. Students will then weigh items listed on worksheet and add according to the directions on the worksheet.

C. The last problem on the worksheet will be to find the weight of three items in grams.

ACTIVIDAD

GRAMO

Material

. Balanza en gramos
. Crayon grande
. Tijeras chicas
. Corcho
. Jabón palmolive
. Frasco de comida para bebé
. Regleta anaranjada
. Gis
. Marcador
. Hojas de papel

Actividad

A. Los estudiantes tendrán como referencia que 1 clip tamaño estandard pesa casi un gramo.

B. Pedirles a los estudiantes que pesen los objetos enlistados una hoja de papel y vayan sumando los pesos de acuerdo a las instrucciones que aparecen en el ejercicio adjunto.

C. El último problema del ejercicio será encontrar el peso en gramos de los tres objetos.

NAME _____ DATE _____

1. Weigh all the items listed on the worksheet.

2. Add the weight of the items in each line (+).

1. SCISSORS _____ LARGE CRAYON + _____ = _____	2. ROCK _____ CORK + _____ = _____
3. SOAP _____ BABY FOOD JAR + _____ = _____	MARKING PEN _____ ORANGE ROD _____ CHALK + _____ = _____

NOMBRE _____ FECHA _____

1. Pesa todas las cosas enlistadas en gramos.

2. Suma el peso de las cosas de cada línea.

1. TIJERAS _____ CRAYON GRANDE + _____ = _____	2. PIEDRA _____ CORCHO + _____ = _____
3. JABON _____ FRASCO + _____ = _____	4. PLUMA _____ REGLETA ANARANJADA + _____ GIS + _____ = _____

ACTIVITY

GRAM

Materials Needed

- Magnets
- Metal objects
- Gram masses
- Balance scale
- Worksheets

Activity

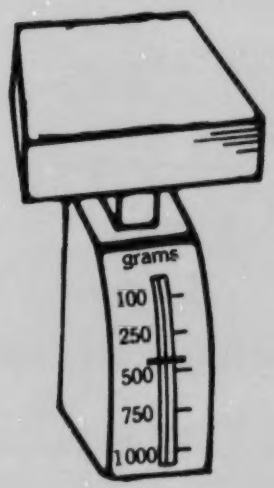
A. Students will be given a variety of metal objects and a magnet.

B. Each student will use a magnet to pick up as many objects as possible.

C. Students will estimate the number of grams they were able to pick up, then measure the actual number of grams using the balance scale and masses.

D. Students will then estimate and find the weight of each item they picked up to see of the sum equals the total number of grams originally measured.

E. If time allows, students will find the average weight of an item by dividing the total weight by the number of objects picked up.



ACTIVIDAD

GRAMO

Material

- Imanes
- Objetos de metal
- Pesas en gramos
- Balanza
- Hojas de papel

Actividad

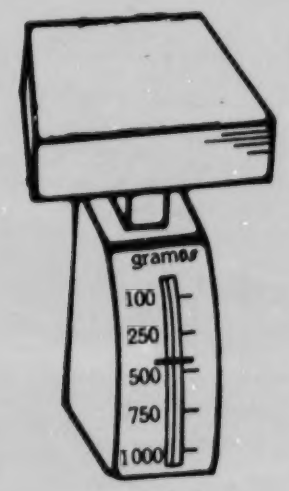
A. Dar a los estudiantes varios objetos de metal y un imán.

B. Pedirle a cada estudiante que recoja con el imán todos los objetos de metal que pueda.

C. Pedirles a los estudiantes que calculen el peso de los objetos que recogieron y después comprueben el peso exacto usando la balanza.

D. Pedirles a los estudiantes que encuentren el peso de cada objeto que recogieron con el imán y comprueben si la suma del peso de cada objeto es igual al peso total que anteriormente se encontró.

E. Si alcanza el tiempo, pedirles a los estudiantes que encuentren el peso promedio de los objetos, dividiendo el peso total entre el número de objetos recogidos.



NAME _____ DATE _____

GRAMS

1. Pick up as many objects as you can with one magnet.
2. Estimate the weight in grams of all the objects together. Record in ☐
3. Weigh how many grams. Record in ☐
4. List each object individually.
5. Estimate and weigh each object.
6. Total up at the bottom.

ESTIMATED WEIGHT OF ALL OBJECTS

☐

ACTUAL WEIGHT OF ALL OBJECTS

☐

OBJECTS	ESTIMATED WEIGHT	REAL WEIGHT
TOTAL		

NOMBRE _____ FECHA _____

GRAMO

1. Con un imán levanta todos los objetos de metal que puedas.
2. Calcula el peso en gramos, de todos los objetos. Apúntalo aquí: [ ]
3. Comprueba el peso exacto. Apúntalo aquí: [ ]
4. Enlista cada objeto abajo.
5. Calcula y pesa cada objeto.
6. Suma el total de gramos abajo.

PESO CALCULADO DE LOS OBJETOS [ ]

PESO EXACTO DE LOS OBJETOS [ ]

OBJETOS	PESO CALCULADO	PESO EXACTO
TOTAL		

ACTIVITY

KILOGRAM

Materials Needed

- kg Mass
- Platform scale
- Different light and heavy objects
- 1-ℓ Bottle with lid
- 1-ℓ Bottle with lid
- Worksheets

Activity

A. Students will be given an assortment of objects such as a brick, book, shoes, etc. They will find the weight of each one by using a platform scale and classify each as to "less than one kg," "about one kg," or "more than one kg." They may add other items found in the room.

B. Remind students that 1 kilogram is equal to 1000 grams and that its abreviation is kg.

ACTIVIDAD

KILOGRAMO

Material

. Pesa de 1 kilo
. Báscula de plataforma
. Diferentes objetos livianos y pesados
. 1 Botella de un litro con su tapa
. 1 Botella de dos litros con su tapa
. Hojas de papel

Actividad

A. Dar a los estudiantes una variedad de objetos como: un libro, un tabique, un par de zapatos, etc. Pedirles que encuentren el peso de cada objeto usando la báscula de plataforma. Pedirles que clasifiquen el peso en el siguiente orden: "menos de un kg", "casi un kg", "más de un kg".

B. Recordarles a los estudiantes que 1 kg es igual a 1000 gramos y que se abrevia kg.

NAME _____ DATE _____

KILOGRAM

Weigh the following items on the platform scale. Find whether the item is less than a kilogram, about a kilogram, or more than a kilogram. Put an X in the correct box.

OBJECT	LESS THAN ONE KILOGRAM	ABOUT ONE KILOGRAM	MORE THAN ONE KILOGRAM
BRICK			
BOOK			
BOTTLE OF WATER (SMALL)			
BOTTLE OF WATER (LARGE)			
NOTEBOOK			
PAIR OF SHOES			

NOMBRE _____ FECHA _____

KILOGRAMO: kg

(KILO)

Pesa los siguientes objetos en la báscula de plataforma, para saber si el objeto pesa menos de un kilo, casi un kilo o más de un kilo. Marca con una X el cuadro correcto.

OBJETO	MENOS DE UN KILO	CASI UN KILO	MAS DE UN KILO
LADRILLO			
LIBRO			
BOTELLA DE UN LITRO CON AGUA			
BOTELLA DE 2 LITROS CON AGUA			
CUADERNO			
PAR DE ZAPATOS			

ACTIVITY

KILOGRAM

Material Needed

. Scale
. Worksheets

Activity

A. Students will choose items from the room that have a weight greater than one kilogram and list them on their worksheet.

B. Students will then estimate the mass of one item and record it.

C. After estimating, students will place the item on the scale to find how many kilograms.

D. Procedure will be repeated for the other items.

E. Students will use the symbol for kilogram after every measurement.

ACTIVIDAD

KILOGRAM

Materiales

. Báscula
. Hojas de papel

Actividad

A. Los estudiantes escojerán algunos objetos que pesen más de un kilo y los enlistarán en una tabla.

B. Los estudiantes adivinarán el peso de cada objeto y lo apuntarán.

C. Los estudiantes comprobarán el peso exacto en la báscula.

D. Los estudiantes proseguirán haciéndolo con todos los objetos.

E. Los estudiantes usarán la abreviación del kilo (kg) después de pesar cada objeto.

NAME_____ DATE_____

GRAMS

Choose several light objects from the room and list them on the worksheet.
Estimate the weight in grams, then meaure on the balance scale.
Record the weights of each object on the chart below.

OBJECT	ESTIMATE IN GRAMS	NUMBER OF GRAMS
Large crayons		
Scissors		
Blackboard eraser		
2 Pens		
10 Sheets of paper		

NOMBRE _____ FECHA _____

GRAMO

Selecciona algunos objetos livianos del salón y enlístalos en una hoja de papel. Adivina el peso en gramos y luego comprueba el peso exacto usando la báscula. Apunta el peso de cada objeto en la tabla.

OBJETO	PESO CALCULADO EN GRAMOS	PESO EXACTO EN GRAMOS
Crayón grande		
Tijeras		
Borrador de pizarrón		
2 Plumas		
10 Hojas de papel		

KILOGRAM

Estimate the weight of each bag of fruit or vegetables then use the platform scale to find the weight of each.

BAG OF FRUIT/VEGETABLES	ESTIMATE	NUMBER OF KILOGRAMS
ORANGES		
APPLES		
PEARS		
BANANAS		
CARROTS		
NUTS		

KILOGRAM

Adivina el peso de cada bolsa de fruta o verdura. Usa la báscula para comprobar el peso de cada bolsa.

BOLSA DE FRUTA/VERDURAS	KILOGRAMOS CALCULADOS	KILOGRAMOS EXACTOS
NARANJAS		
MANZANAS		
PERAS		
PLATANOS		
ZANAHORIAS		
NUECES		

ACTIVITY

KILOGRAM

Materials Needed

. Bathroom scales
. Worksheets

Activity

A. Using bathroom scales, each child will find her/his weight and record it in kilograms.

B. If time allows, heavy things will be placed on the scale and their weight will be found in kilograms.

C. Remind students of the existence of bigger units than a kilogram and the appropriate use. Teach them the names and the symbols of these bigger units.

ACTIVIDAD

KILOGRAMO

Materiales

. Báscula de baño
. Hojas de papel

Actividad

A. Cada estudiante se pesará en la báscula de baño y apuntará su peso en kilos.

B. Si alcanza el tiempo, se pondrán en la báscula objetos pesados y se encontrará su peso en kilos.

C. Mencione a los estudiantes que existen unidades aún más grandes que el kilogramo y que se utilizan para pesar cosas muy pesadas. Se les puede enseñar como se llaman y como se escriben sus símbolos.

KILOGRAM

Estimate the weight of some students. Use the bath scale to find the weight of each student. Record the information on the chart.

STUDENT'S NAME	ESTIMATE	NUMBER OF KILOS

KILOGRAMO

Calcula el peso de algunos de tus compañeros de clase. Usa la báscula de baño para comprobar el peso de cada compeñero. Apunta todos los datos en la tabla.

NOMBRE DEL COMPAÑERO	KILOGRAMOS CALCULADOS	KILOGRAMOS EXACTOS

CONVERSION ACTIVITY

1 kg = 1000 g

Fill in the blanks.

1 kg = _____ g	1000 g = _____ kg
5 kg = _____ g	2000 g = _____ kg
7 kg = _____ g	5000 g = _____ kg
10 kg = _____ g	8000 g = _____ kg
21 kg = _____ g	12000 g = _____ kg
38 kg = _____ g	18000 g = _____ kg
56 kg = _____ g	25000 g = _____ kg
80 kg = _____ g	38000 g = _____ kg
100 kg = _____ g	50000 g = _____ kg

ACTIVIDAD DE CONVERSION

1 kg = 1000 g

Llene los espacios en blanco en la forma correcta.

1 kg = _____ g	1000 g = _____ kg
5 kg = _____ g	2000 g = _____ kg
7 kg = _____ g	5000 g = _____ kg
10 kg = _____ g	8000 g = _____ kg
21 kg = _____ g	12000 g = _____ kg
38 kg = _____ g	18000 g = _____ kg
56 kg = _____ g	25000 g = _____ kg
80 kg = _____ g	38000 g = _____ kg
100 kg = _____ g	50000 g = _____ kg

SYMBOLS AND EQUIVALENCIES

There is a shorter way to write the units of weight (mass). They are called symbols.

The symbols for the units of weight (mass) are:

milligram - mg
centigram - cg
decigram - dm
gram - g
dekagram - dam
hectogram - hg
kilogram - kg

Meter is the basic unit for measuring weight (mass).

The prefixes:

MILLI	means 1/1000	DEKA	means 10
CENTI	means 1/100	HECTO	means 100
DECI	means 1/10	KILO	means 1000

10 DECIgrams equals 1 gram
100 CENTIgrams equals 1 gram
1000 MILLIgrams equals 1 gram

1 DEKAGRAM equals 10 grams
1 HECTOGRAM equals 100 grams
1 KILOGRAM equals 1000 grams

SIMBOLOS Y EQUIVALENCIAS

Existe una forma más corta de escribir las unidades de peso o masa y se les llama símbolos.

Los símbolos de las unidades de peso o masa son:

miligramo - mg
centigramo - cg
decigramo - dg
gramo - dag
decagramo - dag
hectogramo - hg
kilogramo - kg

El gramo es la unidad básica de peso/masa.

MILI significa 1/1000	DECA significa 10
CENTI significa 1/100	HECTO significa 100
DECI significa 1/10	KILO significa 1000

10 DECIgramos igual a 1 gramo
100 CENTIgramos igual a 1 gramo
1000 MILIgramos igual a 1 gramo

1 DECAGRAMO igual a 10 gramos
1 HECTOGRAMO igual a 100 gramos
1 KILOGRAMO igual a 1000 gramos

RESOURCE UNIT
(Unidad de Trabajo)

LITER: A standard unit to measure capacity /volume
(LITRO: Unidad estandard para medir capacidad/volumen)

Dr. Josefina Pulido

Simón Almendares

RESOURCE UNIT

I. Title: Liter: A Standard Unit to Measure CAPACITY/VOLUME

II. General Objectives

A. Knowledge and Concepts

1. To develop in the children knowledge and understanding of:

a. The concept of volume/capacity.
b. The liter as standard unit of measuring volume/capacity.
c. The liter, deciliter, centiliter, milliliter, dekaliter, hectoliter, and kiloliter.
d. When to appropriately use the liter, deciliter, centiliter, milliliter, dekaliter, hectoliter, kiloliter.

2. To acquaint the children with real life situations or problems that call for the skills of measuring capacity.

B. Skills

To develop in children the ability to:

a. Identify the liter and its smaller and bigger units.
b. Use appropriately different units of measurement of volume.
c. Use different kinds of measuring instruments for volume.
d. Solve problems involving measuring volume/capacity.

C. Attitudes

To develop in the children:

a. An appreciation of the importance of the knowledge of and skills in measuring capacity.
b. The realization that the measurement by using the metric system is easy.
c. Awareness of the importance of accuracy in measuring capacity.

III. Content Outline

A. What is capacity?
What is the standard unit for measuring capacity/volume?

B. The smaller units in measuring capacity: deciliter, centiliter, milliliter.

C. The bigger units in measuring capacity: dekaliter, hectoliter, kiloliter.

D. Manipulating the liter and the other measuring instruments.

E. Converting smaller units in measuring capacity into bigger units or vice versa.

IV. Developing the Unit

Initiating the unit - some suggestions:

1. Start a conversation by letting the children tell their experiences in measuring different kinds of liquids and in what situations. What instruments did they use?

2. Cite cases where inaccurate measurements have had disastrous results:

   a. Too much salt in the food at a restuarant - people complained; refused to pay.
   b. Overdose of certain medicines resulting in near fatality.

   Ask the children to cite similar situations from experience.

3. Structure the room with pictures and instruments relating to the ways liquids, powders, grains, etc. are measured. Use these to introduce the new unit.

4. Introduce the new unit directly. Encourage the children to raise questions they would want answered about measuring liquids, powders, grains, etc.

INSTRUCTIONAL ACTIVITIES

LESSON 1

Objectives: After the lesson, the children will be able to:

A. Articulate their understanding of the fact that liquids, powders, grains, etc. can be measured. Mention objects that can be used to measure such as a glass, cup, a tablespoon, etc.

B. Demonstrate their understanding of the meaning of capacity/volume, that capacity/volume is a measure of content.

C. Identify the liter as the standard unit of measuring capacity.

C. Use the liter to measure liquids, powders, and grains in the classroom.

Materials needed:

. Pictures
. Pencils
. Containers of different sizes and shapes
. Liters of different shapes
. Colored pens

Activities: Measuring liquids

A. Present the children with different kinds of liquids, powders, and grains in different shapes of containers. Make them compare the amounts contained in the containers. Tell them that the amount that can be contained in a given container is spoken of as its capacity.

B. Have each child measure the capacity of different containers using arbitrary units like a glass, a cup, etc.

C. Recall the standard unit for length and temperature. Tell the children that there is also a standard unit for capacity and it is the liter. Show the children the liter. Write the word on the board. Ask them if they can tell what the symbol could be. Have the children measure the capacity of different containers using the liter as a standard unit. Ask them to visualize the capacity of one liter using water, powder, and grain.

D. Have the children fill the containers with grain, water, etc.

E. Explain that the liter is especially for measuring liquids.

LESSON 2

Objectives: After the lesson, the children will be able to:

A. Identify the measuring instruments: DECILITER, CENTILITER, and MILLILITER.

B. Identify (and name the symbols of) the liter, deciliter, centiliter, and milliliter, and tell their symbols.

C. Manipulate the calibrated containers - deciliter, centiliters and milliliter in measuring liquids.

D. Identify situations where one can use these measuring units.

Materials needed:

. 3 Calibrated containers of 1 liter (measuring instrument)
. 5 Calibrated containers of 1 deciliter (measuring instrument)
. 6 Calibrated containers in centiliters (measuring instrument)
. 6 Calibrated containers in milliliters (measuring instrument)
. Worksheets
. Different kinds of liquids

Activities

A. Recall the prefixes to indicate measures derived from standard measures. For example:

meter	DECImeter	gram	DECIgram
	CENTImeter		CENTIgram
	MILLImeter		MILLIgram

Ask the children to try to construct a similar chart for capacity using the liter as a standard unit.

B. Ask the children to identify the different measuring containers indicated in the chart.

C. Show the children the symbol for liter and encourage them to deduce what the symbols are for the smaller units.

D. Tell the children to verify the chart by actual measurements. For example: Verify that there are 10 deciliters in one liter, etc.

E. Mention actual situations calling for the measurement of capacity and let the children suggest the appropriate measuring unit to use.

F. Give exercises in estimating capacity and comparing them with actual measurements.

NOTE: Proceed in the same manner in developing the concepts: DEKALITER, HECTOLITER and KILOLITER.

LESSON 3

Objectives: Children will be able to solve problems that involve conversion from small units to bigger units or vice versa.

Materials needed:

- Flash Cards
- Problems written on the board

Activities:

A. Give a flash card drill on the short method of dividing and mulitiplying by tens, hundreds, and thousands.

B. Present several problems that call for the process of conversion. Solve them cooperatively. For example:

Juan has a liter of Coke in his container while Pedro has 20 deciliters in his container. Who has more Coke?

C. Give conversion exercises.

3 l = _____cl		4,000 l _____ kl	
7 dl = _____cl		35,000 l _____ kl	
3 cl = _____ml		300 l _____ hl	
6.7 dl = _____ml		100 l _____ dal	
6 kl = _____l		30 dl _____ l	

ACTIVITIES

ACTIVIDADES

CAPACITY/VOLUME

CAPACIDAD/VOLUMEN

CAPACITY

ACTIVITY

Materials Needed

- Collection of cans & containers from home
- Pitcher
- Dishpan

Activities

A. Students will be shown several common containers found at home and a container filled with water.

B. Each student will choose a container from the collection and decide whether his/hers will hold more or less than the container to check their estimate.

C. After deciding, students will in turn pour the water into their container to check their estimate.

D. Student will help check each other.

ACTIVIDAD DE

CAPACIDAD

Material

. Una jarra
. Una tina de plástico

Actividades

A. Muéstreles a los estudiantes algunos recipientes que son comunes en casa y un recipiente lleno con agua.

B. Cada estudiante escogerá un recipiente y dirá si le cabe más agua o menos agua que el recipiente con agua.

C. Después, al estudiante que le corresponda su turno vaciará el agua a su recipiente para comprobar si lo que dijo es correcto.

D. Los estudiantes se ayudarán uno al otro para comprobar.

CAPACITY ACTIVITY
(CONSERVATION)

Materials Needed

- Collection of bottles, cans, containers, etc. that have the same capacity
- Funnels
- Pitcher
- Dishpan

Activity

A. Children will be shown several containers having the same size but different shapes.

B. They will be asked which ones they think will hold more or hold less.

C. Water will be placed in the container that they choose as the largest, then poured into the next smaller, etc., until each container has been filled with water.

D. Children should agree that all are the same size, because the water fills each container.

ACTIVIDAD DE

CAPACIDAD (CONSERVACION)

Material

. Diferentes botellas, recipientes, latas que tengan la misma capacidad.
. Embudos
. Jarra
. Tina de plástico

Actividad

A. Mostrar a los estudiantes diferentes recipientes que tengan la misma capacidad pero diferente forma.

B. Preguntarles en cual recipiente creen que cabe más agua o menos agua.

C. Llenar de agua el recipiente que ellos han escogido como el más grande, y luego pasar el agua al recipiente que consideran que no es el más grande y asi sucesivamente, hasta que cada recipiente se ha llenado de agua.

CAPACITY ACTIVITY

(CONSERVATION)

Materials Needed

- 3 Plastic containers - same size and shape
- Heavy objects
- Assorted sized cans and containers
- Pitcher
- Dishpan

Activity

A. Student will be given 3 plastic glasses.

B. The same amount of water will be poured into each glass.

C. The student will then place a heavy object such as coins or marbles in each glass so as to raise the water level.

D. The student will then be asked if each glass still has the same amount of water in it.

E. If the concept is difficult for some students, the objects may be removed from the glass so the students can observe that the amount of water in the glass has not changed.

ACTIVIDAD DE CAPACIDAD

(CONSERVACION)

Materiales

- 3 Vasos de plástico del mismo tamaño y la misma forma
- Algunos objetos pesados
- Varios recipientes y latas de diferentes tamaños
- Jarra
- Tina de plástico

Actividad

A. Mostrarles a los estudiantes los vasos de plástico.

B. Poner la misma cantidad de agua en cada vaso.

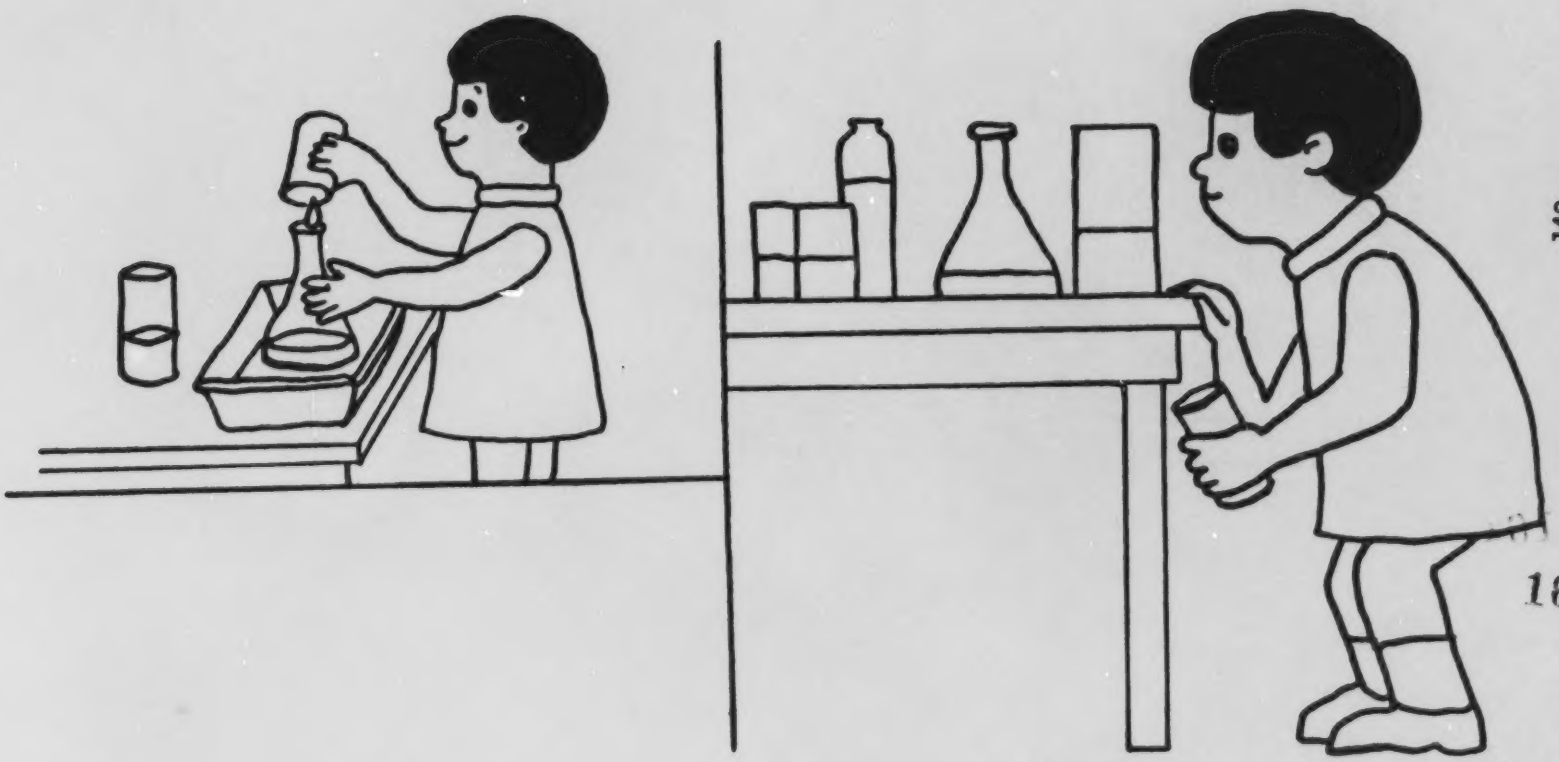
C. Pedirle a los estudiantes que pongan un objeto pesado (monedas, canicas) en cada vaso para aumentar el nivel de agua.

D. Preguntarle a los estudiantes si cada vaso tiene aún la misma cantidad de agua.

E. Si algunos estudiantes tienen dificultad en aprender el concepto, entonces hay que sacar los objetos pesados de los vasos para que los estudiantes observen que la cantidad de agua no ha cambiado.

CONSERVATION

Pour one canful of water into each container on the table. Do they all have the same amount of water in them? Is the water at the same level in each one? Why not?



CONSERVACION

Vacía una lata llena de agua en cada recipiente de la mesa. ¿Tienen la misma cantidad de agua cada uno? ¿Está el agua al mismo nivel en cada uno? ¿Por qué no?

CAPACITY ACTIVITY

(How to Measure Capacity)

Materials Needed

- Large empty milk carton
- Rice
- Baby food jars - small, medium large
- Dishpan
- Worksheets

Activity

A. Students will have large milk cartons and various sizes of baby food jars.

B. Students will estimate how many large baby food jars full of rice can be poured into the milk carton.

C. At this point, rules for measurement should be stressed: (a) be sure to fill each jar to the brim, (b) use finger to level off the jar, (c) use care in pouring so as not to spill.

D. Teacher or student will then measure, recording on the board or scratch paper each time a jar is poured in so as to maintain an accurate count.

E. Same procedure will be followed for each size jar.

F. Remind students of the importance of careful measurement if accuracy is desired. Discuss estimation as a beneficial skill. Mention to children that this is difficult to do at first, but that they will improve as they continue to work at it.

ACTIVIDAD DE CAPACIDAD

(Como Medir Capacidad)

Material

- Varios cartones grandes vacíos de leche
- Bastante arroz
- Frascos vacíos de comida de bebé - grandes, medianos, chicos
- Tina de plástico
- Hojas de papel

Actividad

A. Darles a los estudiantes los cartones vacíos de leche y los frascos vacíos de comida de bebé.

B. Pedirles a los estudiantes que adivinen cuantos frascos grandes de comida de bebé llenos de arroz caben en el cartón vacío de leche.

C. En este momento es cuando se debe mencionar las reglas para medir.

1. Llenar los frascos de arroz hasta el borde.
2. Usar el dedo índice para nivelar el contenido de arroz.
3. Llenar con arroz cuidadosamente los frascos sin tirar el arroz.

D. Mostrarle al estudiante como medir apuntando en una hoja de papel la cantidad de frascos con arroz que caben en el carton vacío de leche.

E. Continuar con el procedimiento hasta que se hayan usado todos los frascos de diferentes tamaños.

F. Recordarles a los estudiantes que es muy importante el ser cuidadoso al medir, especialmente si se quiere ser muy exacto. Decirles que calcular (adivinar cuanto le cabe a un recipiente) es una habilidad que les ayudará mucho.

RULES FOR MEASURING

Put a rubberband around a glass and set it on the table. Pour water carefully into the glass. Bend down so your eyes are at the water level to see if you have filled the glass to the rubber band.

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REGLAS PARA MEDIR

Pon una liga en el vaso y colócalo en la mesa. Llénenlo con agua con cuidado. Agáchate hasta que tus ojos esten al mismo nivel del agua. Asegúrate que has llenado el vaso hasta la liga.

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NAME _____ DATE _____

NON-STANDARD MEASUREMENT

Estimate how many of each size baby food jar it will take to fill the milk carton.

SIZE OF JAR	ESTIMATE	NUMBER OF JARS
LARGE		
MEDIUM		
SMALL		

NOMBRE _____ FECHA _____

MEDIDAS ARBITRARIAS

Calcula cuantos frascos de cada tamaño necesitas para llenar el cartón de leche.

TAMAÑO DEL FRASCO	FRASCOS CALCULADOS	FRASCOS EXACTOS
GRANDE		
MEDIANO		
CHICO		

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NON-STANDARD UNITS

Choose one of the containers listed below. Count how many cups of water it takes to fill it. Draw the number of cups it takes in the correct column. Continue activity with the other two containers.

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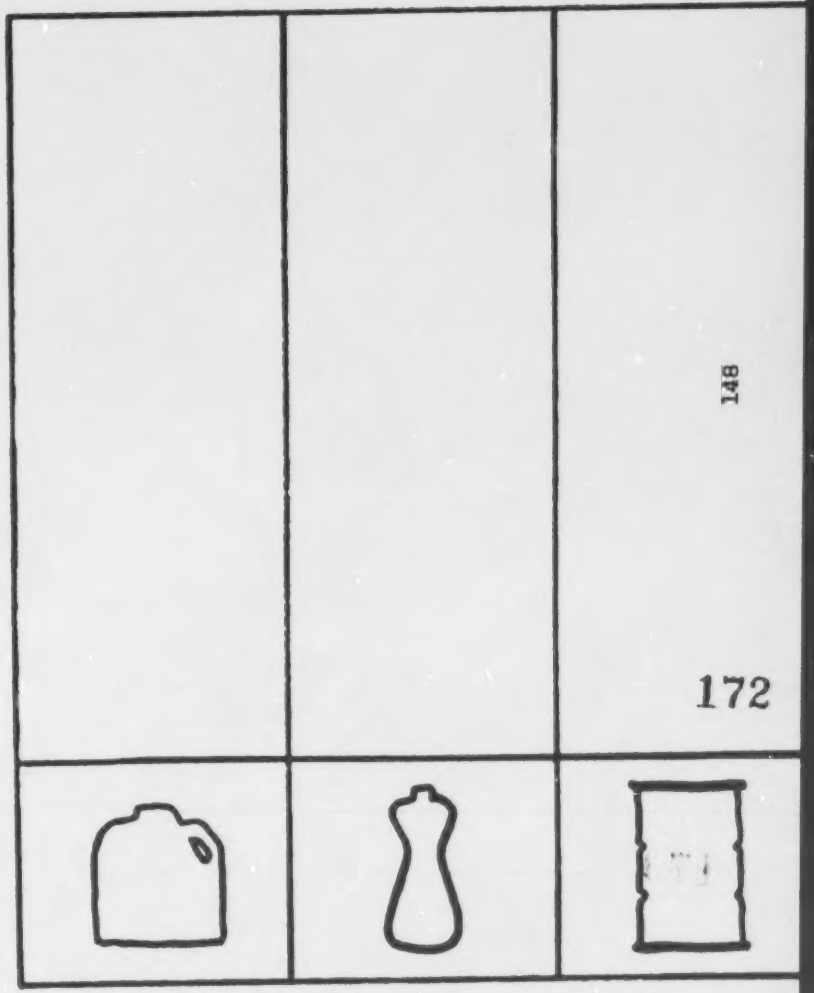

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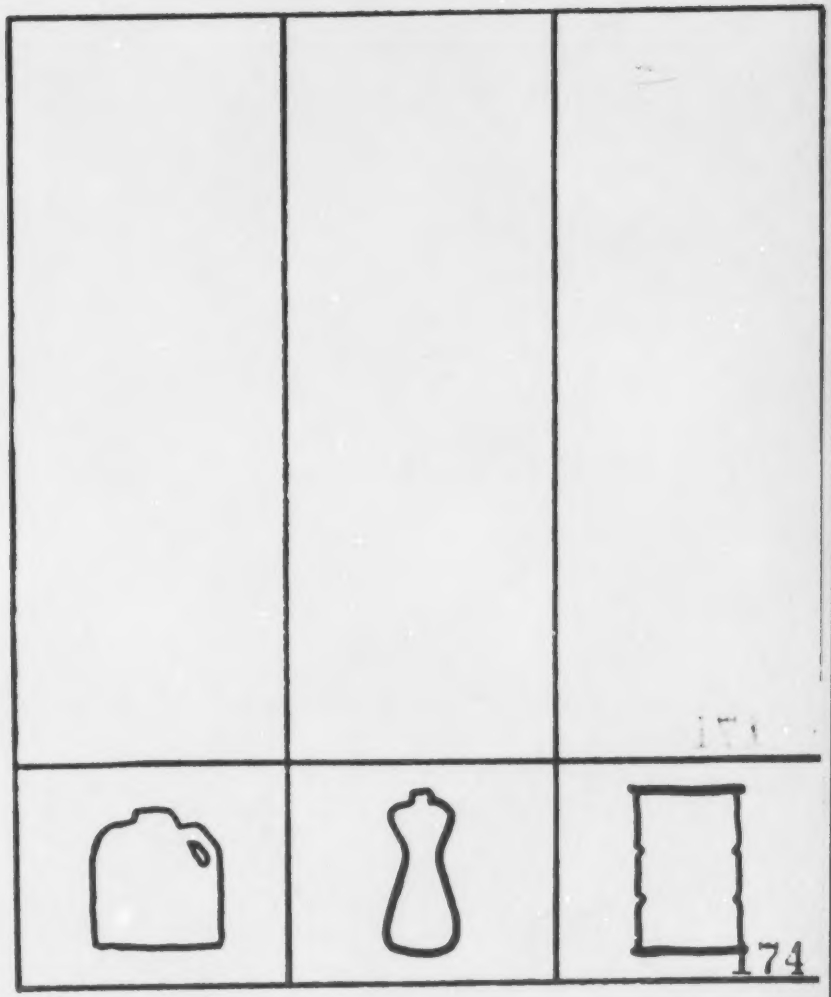
UNIDADES ARBITRARIAS

Escoge uno de los siguientes recipientes. Cuenta cuantas tazas de agua necesitas para llenarlo. Dibuja el número de tasas en la columna correcta. Continúa la actividad con los otros recipientes.



CAPACITY ACTIVITY

LITER

Materials Needed

- Calibrated ℓ-container
- Soda pop bottle
- Coffee can
- Soup can
- Saucepan
- Mixing bowl
- Coffee cup
- Funnels
- Pitcher
- Dishpan
- Worksheets

Activity

A. Students will be shown a calibrated liter container and given an explanation of how to use it.

   1. The container needs to be on a level surface.
   2. Container must be read at eye level.
   3. Students must pour carefully so as not to spill the contents.

B. Students will then be shown a collection of containers and will have to estimate which will hold less than a liter, about a liter, or more than a liter.

C. After estimating students will check their estimates by pouring the water from a liter container into each of the common containers. Children will check the appropriate column.

ACTIVIDAD DE CAPACIDAD

LITRO

Material

- Recipiente calibrado de un litro
- Botella vacía de soda
- Lata vacía de café
- Lata vacía de sopa
- Cazuela pequeña
- Recipiente de plástico
- Vaso de plástico
- Embudos
- Jarra
- Tina chica de plástico
- Hojas de papel

Actividad

A. Mostrarles a los estudiantes el recipiente calibrado de un litro y explicarles como usarlo.

   1. El recipiente de un litro debe estar sobre un nivel plano.
   2. Se debe leer la graduación del recipiente al nivel de los ojos.
   3. El contenido que se ponga en el recipiente debe hacerse en forma muy cuidadosa.

B. Se les mostrará a los estudiantes la variedad de recipientes y tendrán que calcular cuál de los recipientes tiene una capacidad de más de un litro, casi un litro, menos de un litro.

C. Después que los estudiantes han calculado, comprobar la exactitud vaciando el agua del litro calibrado en cada uno de los recipientes y reportarlo en la tabla.

NAME _____ DATE _____

LITER

Measure the capacity of several containers and put an X in the correct box.

CONTAINER	LESS THAN ONE LITER	ABOUT 1 LITER	MORE THAN A LITER
COFFEE CAN			
SOUP CAN			
SAUCE PAN			
COFFEE CUP			
MIXING BOWL			
SODA POP BOTTLE			

NOMBRE _____ FECHA _____

LITRO

Mide la capacidad de los recipientes y marca con una X en el cuadro correcto.

RECIPIENTE	MENOS DE UN LITRO	UN LITRO	MAS DE UN LITRO
LATA DE CAFE VACIA			
LATA DE SOPA VACIA			
OLLA			
TAZA DE CAFE			
RECIPIENTE DE PLASTICO			
BOTELLA DE REFRESCO			

LITER

Find how many liters fill the large containers. First estimate, then actually measure. Make a mark for each liter to keep track of how many liters there are.

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CONTAINER	ESTIMATE	MEASURE
1.		
2.		
3.		
4.		

LITRO

Mide los recipientes grandes para ver cuantos litros caben. Tienes que calcular y luego medir. Pon una marca para cada litro para contarlos.

RECIPIENTE	CALCULO	MEDIDA EXACTA
1.		
2.		
3.		
4.		

CAPACITY ACTIVITY

Materials Needed

- Calibrated ℓ container
- Assorted smaller containers
- Pitcher
- Dishpan
- Worksheets

Activity

A. Each team of students will be given a liter container and an assortment of smaller containers labeled with A, B, and C.

B. Students, on their worksheets, will record an estimate for each smaller container, determining how many of each filled with water will fit into a liter container.

C. Students will then fill the smaller container "A" with water and pour it into the liter container, counting how many it takes to fill the liter.

D. Continue procedure with B and C containers.

E. Remind the students how to write the symbol for liter (ℓ).

ACTIVIDAD DE CAPACIDAD

Materiales

- Recipiente calibrado de un litro
- Varios recipientes pequeños
- Jarra
- Tina de plástico
- Hojas de papel

Actividad

A. Darle a cada equipo de estudiantes un recipiente de un litro y algunos recipientes pequeños marcados con las letras A, B, y C.

B. Los estudiantes calcularán y apuntarán cuantos de cada uno de los recipientes pequeños llenos de agua caben en un recipiente calibrado de un litro.

C. Los estudiantes empezarán a llenar con agua el recipiente pequeño marcado con la letra "A" y lo vaciarán en el recipiente de un litro. Contando cuantos se necesitan para llenarlo.

D. Continúe el procedimiento para los recipientes "B" y "C".

E. Recuérdeles a los estudiantes como escribir el símbolo del litro (ℓ).

NAME _____ DATE _____

LITER

Estimate and measure how many of these containers it will take to fill a liter container.

CONTAINER	ESTIMATE	NO. NEEDED FOR 1 LITER

NOMBRE _____ FECHA _____

LITRO

Calcula y mide cuantos de estos recipientes necesitas para llenar un litro.

RECIPIENTE	¿CUANTOS RECIPIENTES CALCULAS PARA LLENAR 1 LITRO?	¿CUANTOS RECIPIENTES EXACTOS NECESITAS PARA LLENAR 1 LITRO?

CAPACITY ACTIVITY

DECILITER, CENTILITER, AND MILLILITER

Materials Needed

. Set of calibrated containers:
  liter
  deciliter
  centiliter
  milliliter
. 6 Assorted cans and containers collected from home
. Pitcher
. Dishpan
. Worksheets

Activity

A. Students will review explanation of calibrated container and its use.

  1. level surface
  2. eye level (stoop to read; don't lift container)
  3. do not spill

B. Students will be given a calibrated container and will choose a common container labeled A-F.

C. They will estimate the number of milliliters the common container will hold and record the estimate.

D. They will then fill the calibrated container with water and pour it carefully into the common container to the brim.

E. Children will be reminded of the symbol for ℓ and mℓ.

F. They will read the number of milliliters and record it on the worksheet.

G. Children will record their measurements using mℓ each time.

H. Remind students that:

  10 dℓ = 1 ℓ
  100 cℓ = 1 ℓ
  1000 mℓ = 1 ℓ

ACTIVIDAD DE CAPACIDAD

DECILITRO, CENTILITRO, Y MILILITRO

Material

. Varios recipientes calibrados:

de litro
de 1 decilitro
en centilitros
en mililitros

. Varias latas vacías y recipientes
. Jarra
. Tina de plástico
. Hojas de papel

Actividad

A. Repasar a los estudiantes la explicación de como usar los recipientes calibrados de: un litro, un decilitro, en centilitros y en mililitros.

1. Poner los recipientes sobre una superficie plana.
2. Hacer la lectura al nivel de los ojos.
3. No derramar el contenido de los recipientes.

B. Darles a los estudiantes un recipiente calibrado y dejarles escoger un recipiente común marcado con alguna letra de la "A" a la "F".

C. Los estudiantes calcularán el número de mililitros que caben en el recipiente común y los apuntarán.

D. Los estudiantes empezarán a llenar con agua el recipiente calibrado en decilitros, centilitros o mililitros y lo vaciarán cuidadosamente en el recipiente común hasta el raz.

E. Recordarles a los estudiantes como se escriben los símbolos del litro (ℓ), decilitro (dℓ), centilitro (cℓ) y mililitro (mℓ).

F. Los estudiantes apuntarán cuántos decilitros o centilitros o mililitros caben en el recipiente común.

G. Los estudiantes usarán los símbolos dℓ, cℓ o mℓ para apuntar.

H. Recuérdeles a los estudiantes que:

10 dℓ = 1 ℓ
100 cℓ = 1 ℓ
1000 mℓ = 1 ℓ

MILLILITER

Choose one container from the collection. Estimate how many milliliters of water it holds. Then measure with a calibrated container. Record estimate and measure. Repeat with other containers.

CONTAINER	ESTIMATE	MEASURE
A.		
B.		
C.		
D.		
E.		
F.		

MILILITRO

Escoge un recipiente cualquiera y calcula cuantos mililitros de agua le caben. Compruébalo usando el recipiente calibrado en mililitros con agua, vacíala cuidadosamente en el recipiente común. Apunta lo que calculaste y lo que mediste en la tabla. Repite el procedimiento para otros recipientes.

RECIPIENTE	CALCULO	MEDIDA EXACTA
A.		
B.		
C.		
D.		
E.		
F.		

CAPACITY ACTIVITY

"WITCH'S BREW"

Materials Needed

- Set of calibrated containers
- 2 Pitchers
- Dishpan
- Worksheets

Activity

A. Students will follow directions on recipe.

B. They will make "witch's brew" by adding and subtracting various numbers of milliliters of water into a large pitcher until the final step is completed.

C. They will then determine how many milliliters they have made.

D. The students should each end up with 1000 milliliters (2 liters) of water if directions are followed. If they do not, emphasize the importance of measuring accurately and following directions step-by-step. Decide as a group how much "witch's brew" each person would get if 10 students were to share.

RECIPE

1. Pour in 100 mℓ of water.
2. Pour in 300 mℓ of water.
3. Pour out 200 mℓ of water.
4. Pour in 700 mℓ of water.
5. Pour out 400 mℓ of water.
6. Pour in 500 mℓ of water.

ACTIVIDAD DE CAPACIDAD

"POCION DE BRUJAS"

Material

. Varios recipientes calibrados
. 2 Jarras
. 1 Tina de plástico
. Hojas de papel

Actividad

A. Pedirles a los estudiantes que sigan las instrucciones de la receta.

B. Para poder preparar la poción de brujas deberán sumar o restar los mililitros de agua que se piden.

C. El agua de la receta se irá acumulando en una jarra hasta que se determine cuantos mililitros en total se necesitaron para completar la receta.

D. Al finalizar la actividad los estudiantes deben tener 1000 mililitros (1 litro) de agua. Si no se tiene esta respuesta, enfatizar a los estudiantes de la importancia de medir con exactitud y siempre seguir las instrucciones paso por paso. Preguntarles a los estudiantes cuanta poción de brujas correspondería a cada estudiante si se repartiera entre 10 estudiantes.

Receta

1. Poner 100 mℓ de agua.
2. Poner 300 mℓ de agua.
3. Quitar 200 mℓ de agua.
4. Poner 700 mℓ de agua.
5. Quitar 400 mℓ de agua.
6. Poner 500 mℓ de agua.

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CAPACITY ACTIVITY

Materials Needed

- Sponges
  - square
  - circle
  - rectangle
  - crescent
  - L-shaped
  - triangle
- 100-mℓ container
- ℓ-container

Activity

A. Students will be given several sponges of different shapes and a container of water.

B. The sponges will be put in order according to the amount of water the students think they will hold.

C. The students will then soak the sponges, as much as they will hold without dripping.

D. Have students squeeze the water into a calibrated container and record the number of milliliters.

E. Students will then calculate the number of liters.

ACTIVIDAD DE CAPACIDAD

Material

. Esponjas de diferentes formas:
  cuadrada
  circular
  rectangular
  triangular
. Recipiente calibrado en mℓ (100 mℓ)
. Recipiente calibrado de un litro

Actividad

A. Darles a los estudiantes varias esponjas de diferentes formas y un recipiente con agua.

B. Acomodar las esponjas en orden de acuerdo a la cantidad de agua que los estudiantes piensan que absorberán.

C. Los estudiantes empaparán las esponjas con agua tanto como les sea posible.

D. Después exprimirán cada una de las esponjas en el recipiente calibrado de un litro y entonces comprobarán lo que calcularon que absorbería la esponja con lo que están recibiendo. Reportar el resultado en mℓ y ℓ.

SPONGE ACTIVITY

Put the sponges in order according to the amount of water they will hold.

Fill the sponges with water, as much as they will hold without dripping. Squeeze the water into a calibrated container.

Complete the chart below.

SPONGE SHAPE	NO. OF mℓ THAT IT HOLDS	NO. OF ℓ THAT IT HOLDS
Square		
Circle		
Rectangle		
Crescent		
L-shaped		
Triangle		

ACTIVIDAD DE ESPONJAS

Pon las esponjas en orden según la cantidad de agua que puedan absorber.

Empapa las esponjas con agua, lo más que puedas sin gotear. Exprime el agua en un recipiente calibrado de un litro. Completa la tabla.

FORMA DE LA ESPONJA	¿CUANTOS mℓ ABSORBE?	¿CUANTOS ℓ ABSORBE?
Cuadrada		
Circular		
Rectangular		
Triangular		

MORE THAN A LITER

Collect some containers which will hold more than a liter. Estimate how many liters it will take to fill each; then measure. Complete the chart.

	ESTIMATE		MEASURE	
1 bucket =	_____ ℓ	_____ daℓ	_____ ℓ	_____ daℓ
1 dishpan =	_____ ℓ	_____ daℓ	_____ ℓ	_____ daℓ
1 big pot =	_____ ℓ	_____ daℓ	_____ ℓ	_____ daℓ
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

MAS QUE UN LITRO

Junta algunos recipientes que contengan más de un litro de capacidad. Calcula cuantos litros necesitas para llenar cada uno; luego mídeles con exactitud. Termina la tabla.

	CALCULO		MEDIDA EXACTA	
1 balde =	_____ ℓ	_____ daℓ	_____ ℓ	_____ daℓ
1 tina para trastes =	_____ ℓ	_____ daℓ	_____ ℓ	_____ daℓ
1 olla =	_____ ℓ	_____ daℓ	_____ ℓ	_____ daℓ
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

CAPACITY ACTIVITY

DEKALITER

Materials Needed

- Calibrated container of one liter
- Bucket
- Big pot
- Large container
- Dishpan
- Worksheets

Activity

A. Students will be given a calibrated container and several large containers such as a bucket, dishpan, etc.

B. Students will estimate the capacity of each container before actually measuring. Have students record their estimates.

C. The symbol for dekaliter (daℓ) should be written after each estimate and measurement.

D. Students will fill the large container to the brim with water. Students will then pour the water into the liter container counting the number of times it is filled. Have students record their measurements. Have in ℓ and daℓ.

E. Remind students of the existance of bigger units than a dekaliter and the appropriate use. Teach them the names and the symbols of these bigger units.

ACTIVIDAD DE CAPACIDAD

DECALITRO

Material

. Cubeta grande
. Olla grande
. Recipiente grande de plástico
. Hojas de papel
. Recipiente calibrado de 1 litro
. Tina grande de plástico

Actividad

A. Darles a los estudiantes un recipiente calibrado de un litro y varios recipientes grandes como: cubetas de plástico, tinas de plástico, etc.

B. Los estudiantes calcularán la capacidad de cada recipiente antes de medir con exactitud. Pedirles a los estudiantes que apunten sus respuestas.

C. Recordarles a los estudiantes que deben de escribir el símbolo (daℓ) después de calcular y medir.

D. Los estudiantes empezarán a medir la capacidad de los recipientes grandes usando el recipiente calibrado de un litro con agua, hasta que el recipiente grande quede al borde. Los estudiantes apuntarán el número de litros que le caben a cada recipiente grande y los reportará en decalitros.

E. Mencione a los estudiantes que existen unidades aún más grandes que el decalitro y se usan para medir capacidades muy grandes. Se les puede enseñar como se llaman y como se escriben sus símbolos.

CONVERSION ACTIVITY

1 ℓ = 1000 mℓ

Fill in the blanks.

1 ℓ = _____ mℓ	1000 mℓ = _____ ℓ
2 ℓ = _____ mℓ	3000 mℓ = _____ ℓ
5 ℓ = _____ mℓ	8000 mℓ = _____ ℓ
8 ℓ = _____ mℓ	13000 mℓ = _____ ℓ
12 ℓ = _____ mℓ	17000 mℓ = _____ ℓ
20 ℓ = _____ mℓ	20000 mℓ = _____ ℓ
30 ℓ = _____ mℓ	27000 mℓ = _____ ℓ
40 ℓ = _____ mℓ	35000 mℓ = _____ ℓ
50 ℓ = _____ mℓ	50000 mℓ = _____ ℓ

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ACTIVIDAD DE CONVERSION

1 ℓ = 1000 mℓ

Llene los espacios en blanco en la forma correcta.

1 ℓ = _____ mℓ	1000 mℓ = _____ ℓ
2 ℓ = _____ mℓ	3000 mℓ = _____ ℓ
5 ℓ = _____ mℓ	8000 mℓ = _____ ℓ
8 ℓ = _____ mℓ	13000 mℓ = _____ ℓ
12 ℓ = _____ mℓ	17000 mℓ = _____ ℓ
20 ℓ = _____ mℓ	20000 mℓ = _____ ℓ
30 ℓ = _____ mℓ	27000 mℓ = _____ ℓ
40 ℓ = _____ mℓ	35000 mℓ = _____ ℓ
50 ℓ = _____ mℓ	50000 mℓ = _____ ℓ

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SYMBOLS AND EQUIVALENCIES

There is a shorter way to write the units of capacity/volume; they are called symbols.

The symbols for the units of capacity/volume are:

milliliter - mℓ
centiliter - cℓ
deciliter - dℓ
liter - ℓ
dekaliter - daℓ
hectoliter - hℓ
kiloliter - kℓ

LITER is the basic unit for measuring capacity/volume.

The prefixes are:

MILLI means 1/1000	DEKA means 10
CENTI means 1/100	HECTO means 100
DECI means 1/10	KILO means 1000

10 DECIliters equals 1 liter
100 CENTIliters equals 1 liter
1000 MILLIliters equals 1 liter

1 DEKALITER equals 10 liters
1 HECTOLITER equals 100 liters
1 KILOLITER equals 1000 liters

SIMBOLOS Y EQUIVALENCIAS

Existe una forma más corta de escribir las unidades de capacidad/volumen y se les llama símbolos.

Los símbolos de las unidades de capacidad/volumen son:

mililitro - mℓ
centilitro - cℓ
decilitro - dℓ
litro - ℓ
decalitro - daℓ
hectolitro - hℓ
kilolitro - kℓ

El litro es la unidad básica de capacidad/volumen.

Los prefijos:

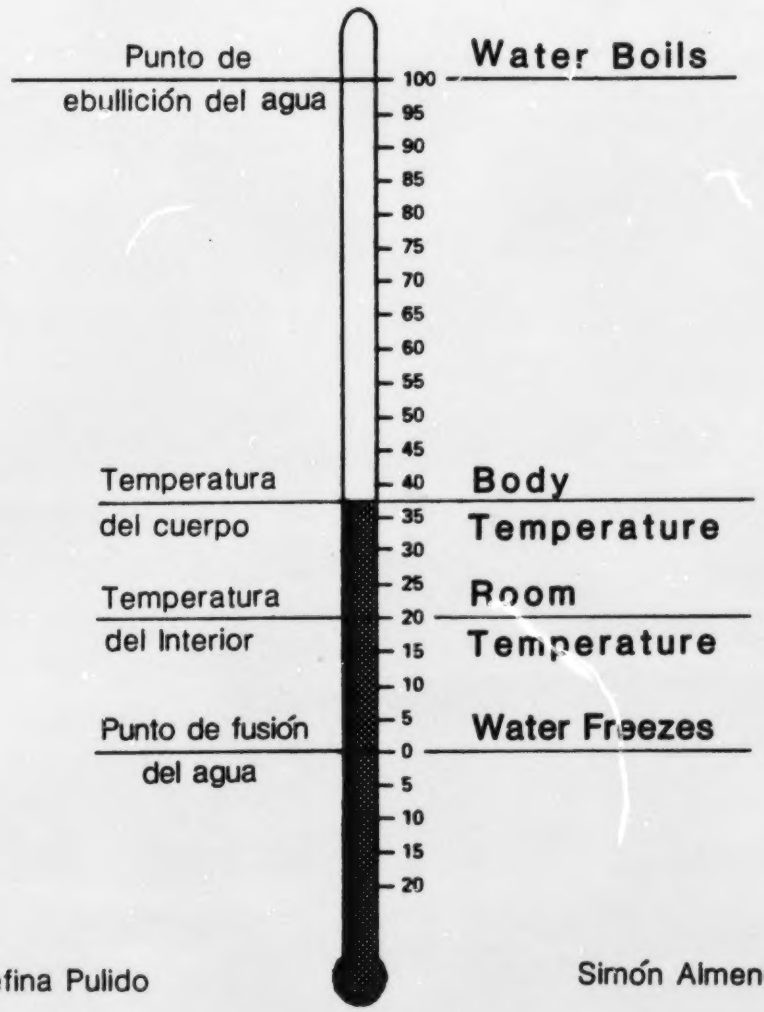
MILI significa 1/1000	DEKA significa 10
CENTI significa 1/100	HECTO significa 100
DECI significa 1/10	KILO significa 1000

10 DECIlitros igual a 1 litro
100 CENTIlitros igual a 1 litro
1000 MILIlitros igual a 1 litro

1 DECALITRO igual a 10 litros
1 HECTOLITRO igual a 100 litros
1 KILOLITRO igual a 1000 litros

RESOURCE UNIT
(Unidad de Trabajo)

TEMPERATURE & THE USE OF THE CELSIUS THERMOMETER
(LA TEMPERATURA Y EL USO DEL TERMOMETRO CELSIUS)



Dr. Josefina Pulido

Simón Almendares

Resource Unit

I Title: TEMPERATURE AND THE USE OF THE CELSIUS THERMOMETER

II General Objectives

A. Knowledge and Concepts:

1. To develop in the children knowledge and understanding of:

a) the concept of "temperature";
b) the thermometer as an instrument for measuring temperature and how it works,
c) the Celsius thermometer scale;
d) the important frames-of-reference for remembering everyday temperatures particularly weather or air temperatures, body temperatures, and cooking temperatures;

2. To familiarize the children with real-life situations where the knowledge about temperature/the skill in thermometer reading is useful.

B. Skills :

1. To develop in the children:

a) the ability to identify various temperature conditions: hot, cold, warm, etc.
b) the ability to identify the thermometer;
c) the ability to read the thermometer using the Celsius temperature scale.
d) the ability to tell from memory the frames-of-reference relating to everyday temperatures ex. 0^{o} water freezes, 100^{o} water boils, etc.
e) the ability to apply thermometer reading skills in problem-solving situations.

C. Attitudes:

1. To develop in the children:

a) an appreciation of the usefulness of the knowledge about temperature and of the skill in thermometer reading.
b) the feeling that reading the Celsius temperature scale is easy.

III Content Outline

A. Temperature: What does it mean?

1. How may temperature be defined?
2. What has temperature to do with our daily life?

B. Measuring Temperature

1. How is temperature measured?
2. What is a thermometer? How does it work?

C. Thermometer Reading

1. How does one read the thermometer?

a) What is the Celsius Temperature Scale?
b) What are its distinguishing features?

2. What are some frames of reference for remembering everyday temperatures relative to the weather (air temperatures), body temperatures, and cooling temperatures?

IV Developing the Unit

A. Initiating the Unit: Some suggestions:

1. Start a conversation with the class asking the children if they had had experiences relative to changes in the weather and how these changes affected them. Use these discussions to introduce the new unit.

2. Encourage the children to recall any experience they have had in the use thermometers. Relate these to the new unit.

3. Structure the room with pictures relating to the ways differing temperatures affect people. Relate these to the new unit.

4. Introduce the new unit directly. Encourage the children to raise questions they would like answered about temperature and about thermometer reading. Write all the questions on the board. (Transfer these later to a chart for reference as the unit develops).

C. Instructional Activities

LESSON 1

OBJECTIVE

For the children to be able to: 1) identify varied temperature conditions - cold, warm, hot, etc., 2) describe some behaviors of people as influenced by the changes in temperature, 3) tell in simple terms what temperature means.

MATERIALS NEEDED

- Pictures (as indicated in the activities that follow)
- Water containers
- Cold water, warm water, tepid water

ACTIVITIES

1. Show the class pictures of people dressed for different kinds of weather. Initiate a conversation as to why the people in the picture are dressed as they are. Discuss the kinds of weather conditions those clothes are suited for. Discuss what parts of the year are relatively cool, warm, very cold, very hot; what times of the day it is generally cooler, warmer, etc.

2. Show a picture showing an outdoor scene on a warm day. Where do people go or what do they do to get relief on a hot day? Show a picture showing a scene when the weather is very cold. What do people do to get relief during a very cold day?

3. Fill containers with cold, tepid, and warm water. Let the children dip a finger in the water and describe the water temperature using the expressions warm, tepid and cool. Ask what kind of water they would use if they wanted to take a shower; if they wanted a drink on a hot day; if they wanted to water their plants. Ask the children questions like: How do you want your coke? How do you want your soup? How do you want your orange juice?

4. Ask the children something like: Have you ever told your mother that you were not feeling well? What was the first thing that she did? What did she tell you to do when she found out that you were feverish?

5. Say something like: When people are talking about things or people being hot or warm or cold, as we are doing now,

they are talking about temperature. (Write the word on the blackboard.) Say the word. When people talk about temperature, they are talking about the degrees of heat or cold. We were just talking about how temperature affects people. Let us summarize what we said. Mention one way by which the temperature affects people. (Ex. Temperature affects the way we clothe ourselves.)

6. Say something like: Do you think we can measure temperature? Tomorrow we shall talk about measuring temperature.

7. Seat-work

   a. Children get a set of paper dolls with various wardrobes. The set includes pictures of different weather conditions and children will dress the paper dolls appropriately to suit the given weather conditions.

   b. Children may be asked to draw different attires and to indicate by writing the words warm or cold to indicate their knowledge of the appropriateness of the attires they draw.

LESSON 2

OBJECTIVE

For the children to be able to: 1) identify the thermometer, 2) describe the parts of the thermometer, and 3) tell how the thermometer works.

MATERIALS NEEDED

- A large demonstration thermometer
- Thermometers
- Water containers

ACTIVITIES

1. Recall the discussion the day before: What does temperature refer to? How does temperature affect people?

2. Say something like: Yesterday we said we would find out if we could measure temperature.

   Show children the demonstration thermometer. Let the children describe what they see on the face of the temperature. Tell what they are or stand for.

3. Give explanation of the movement of the red line: up - gets hotter, down - gets colder.

4. Place thermometers in containers with water of different termperatures - iced water, warm water, boiling water. Let children see the thermometers and note the differences in the level of the mercury in the thermometer.

5. Group the children in small groups. Give each group a thermometer. Let the children experiment by letting a child hold the bulb of the thermometer for some time and to observe the rising of the mercury as the thermometer is warmed.

6. Let the children summarize learnings by recalling the main information learned. What is the instrument called? What does it measure? What is the liquid in the thermometer called? What happens to the mercury when it gets hotter? Cooler? Can you tell why it is important that there is an instrument to tell temperature?

LESSON 2 (continued)

7. Arouse the children's interest to be able to read the thermometer. How many would like to be able to read the thermometer? Tomorrow we shall do that.

LESSON 3

OBJECTIVES

For the children to: 1) become familiar with the Celsius temperature scale; 2) be able to read the thermometer (Celsius); be able to record temperature readings.

MATERIALS

- Ice
- Water containers
- Several thermometers
- Recording sheets
- Demonstration thermometer

ACTIVITIES

1. Review past learnings relative to temperature and the thermometer.

2. Tell the class the story of Anders Celsius. Introduce the Degree Celsius and the Celsius temperature scale.

3. Place thermometer in iced water. Using the demonstration thermometer, indicate the thermometer reading and let the class say it. Write the thermometer reading as it should be recorded. Let the class read the recording. Do the same with tepid water and with boiling water.

4. Provide groups with thermometers and recording sheets. Different groups measure different things and record them on the recording sheets.

5. Summarize new things learned.

THE CELSIUS THERMOMETER

In the metric system the unit for measuring temperature is the DEGREE CELSIUS. You will always see Celsius spelled with a capital letter because it is really the last name of the man who invented the Celsius thermometer. He was Anders Celsius and he lived in Sweden about 200 years ago.

Anders Celsius was an astronomer. His science was that of the sun and the moon, the stars and the other planers. As a scientist he often used a thermometer.

But Celsius thought the thermometers being used were too complicated. So in 1742 he invented one he thought was easier to use.

Like other thermometers, it had a glass tube that held mercury. Mercury is a liquid chemical that is very sensitive to heat and cold. It expands or gets bigger when it is heated, and it contracts or gets smaller then it is cooled. The hotter the mercury gets, the higher it rises in the glass tube. As it gets colder, the mercury falls lower and lower down the tube.

Celsius decided to divide his thermometer into 100 units of grades. He called it a centigrade thermometer. Remember, the prefix "centi" means 1/100.

When measuring temperature you write C after the number.

°C means DEGREE CELSIUS.

To find starting and ending points on his thermometer, Celsius boiled some water. He put the glass tube filled with mercury into the boiling water and watched to see how high the mercury rose in the tube. As its highest point he marked a line and wrote 100.

After he let the glass tube cool, he put ice in a container and put the tube into the ice. He marked a line at the point where the mercury came in the tube and wrote 0. These starting and ending points are called REFERENCE POINTS. Then Celsius divided the space on the tube between the two reference points into 100 equal units and called each unit a DEGREE, just as other scientists had called the units on their thermometers.

With the Celsius thermometer water freezes at 0 °C and boils at 100 °C. Most thermometers have extra degrees marked below 0 °C, and some also have extra degrees marked about 100 °C, so that temperatures colder than freezing water, and hotter than boiling water can also be measured.

Source: The Thermometer Is
by Jerolyn Ann Nentl

LESSON 4

OBJECTIVES

For the children to: 1) be familiar with the frames of reference for remembering Degree Celsius temperatures; 2) be able to make estimates with temperatures and to compare them with actual readings; 3) understand the importance of accurate temperature readings.

MATERIALS NEEDED

- Demonstration thermometer
- Several thermometers
- Recording sheet, on Manila paper
- Frame-of-reference chart on Manila paper

ACTIVITIES

1. Recall previous learnings relative to the unit. Discuss again the Celsius thermometer and how to read it properly.

2. Present the frame-of-reference chart and explain the items.

3. Using the recording chart, let the children estimate the temperatures enumerated, record the estimates, then actually measure the temperatures, record the readings, and let class compare.

RECORDING SHEET

TEMPERATURE	DEGREES CELSIUS (^{o} C)	
	Estimate	Measure
ROOM TEMPERATURE		
OUTSIDE AIR TEMPERATURE		
TEMPERATURE OF THE WATER FROM A DRINKING FOUNTAIN		
TEMPERATURE OF THE WATER JUST AS IT BOILS		
TEMPERATURE OF A PIECE OF ICE		
YOUR BODY TEMPERATURE TAKEN UNDER ARM		

4. Discuss the importance of accuracy in temperature reading.

5. Present problem-solving situations. Ex.

   a. Jose's body temperature is 39° Celsius. What should he do?

   b. Maria was asked by her mother to warm some left-over food. How should the oven temperature be?

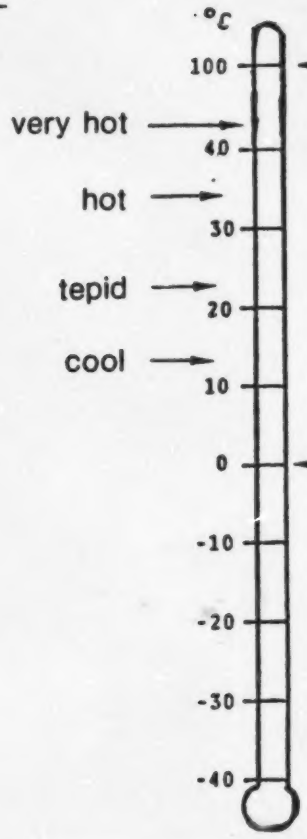
6. Seat-work. Ex.

   Draw thermometers to show:

   1. the reading at boiling point

   2. the reading at freezing point.

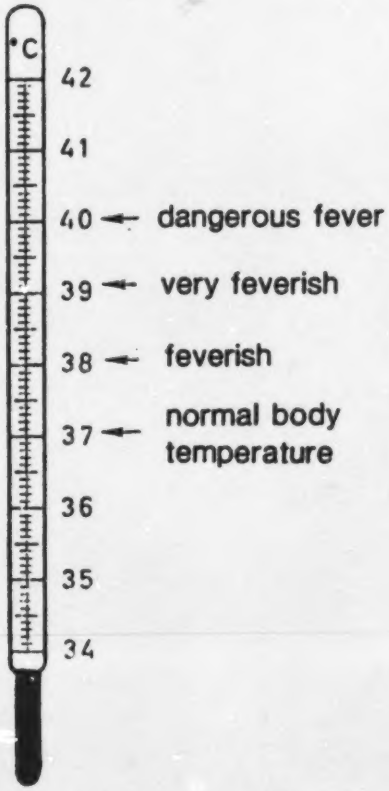
WEATHER



FRAME OF REFERENCE
DEGREE CELSIUS

-40°C=-40°F

BODY TEMPERATURE



ACTIVITIES

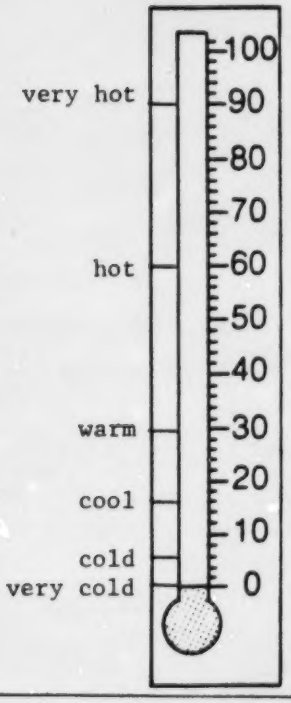
ACTIVIDADES

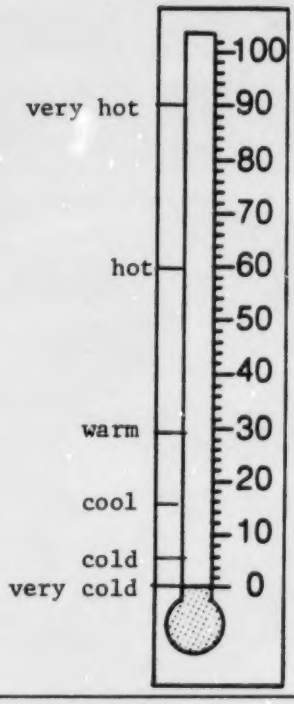
TEMPERATURE

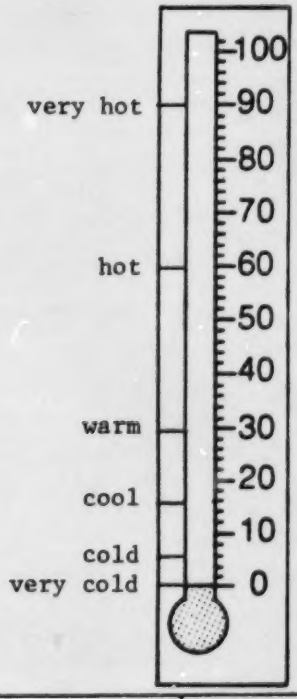
TEMPERATURA

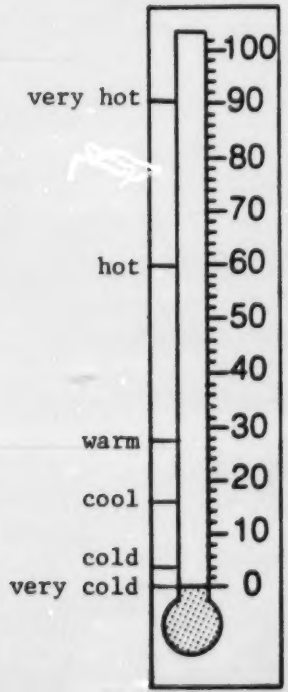
NAME _____ DATE _____

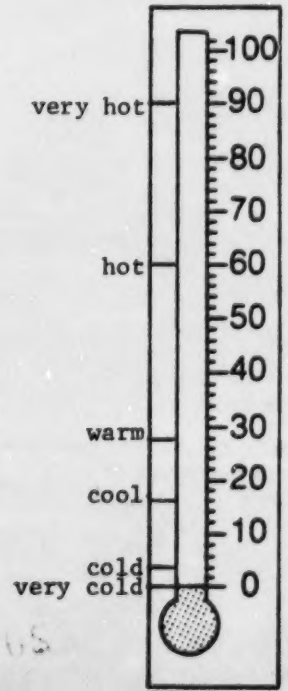
COLOR EACH THERMOMETER.

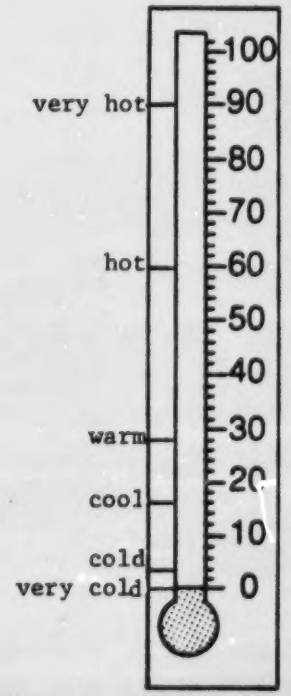






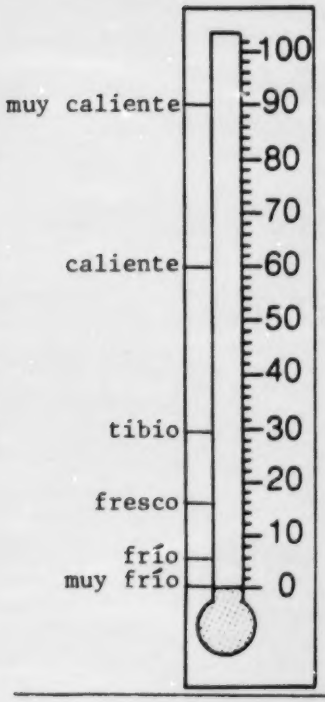


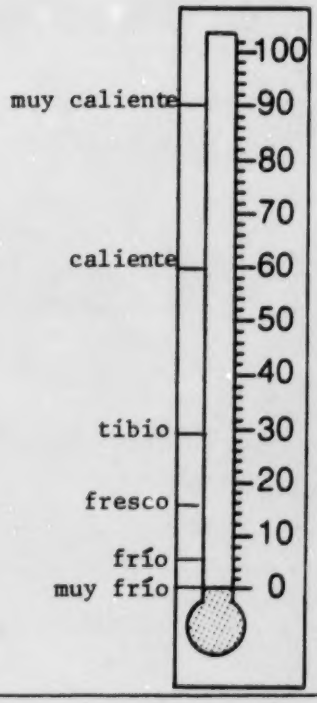


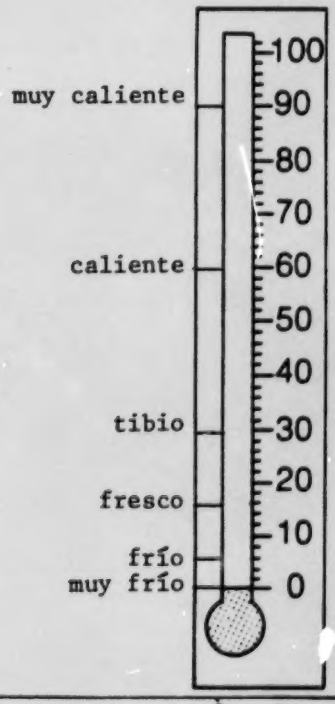


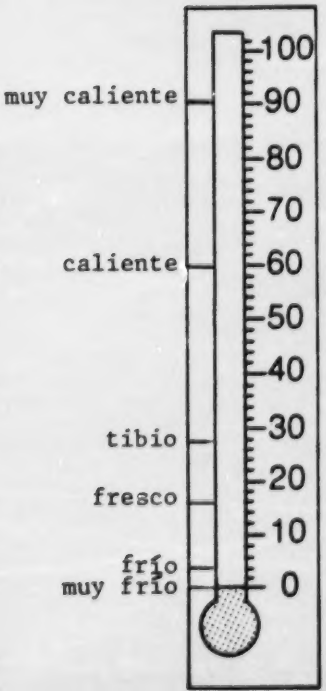
NOMBRE _____ FECHA _____

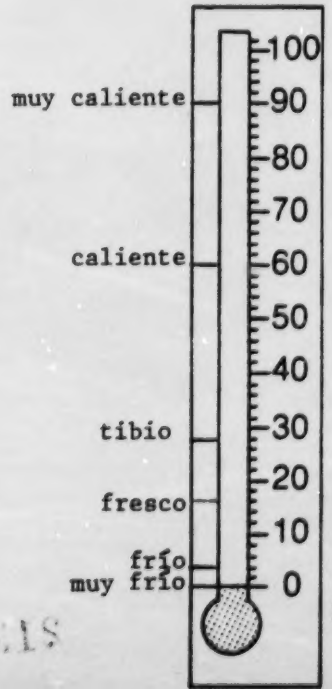
COLOREA CADA TERMÓMETRO.

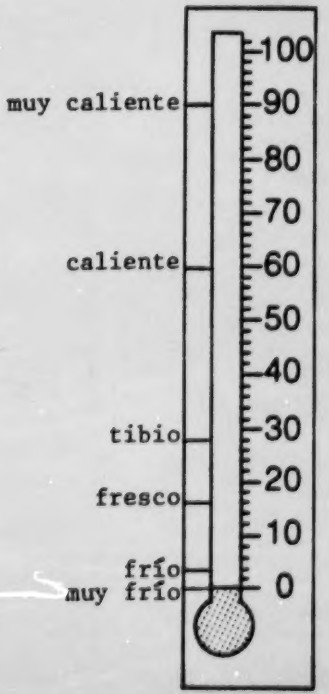










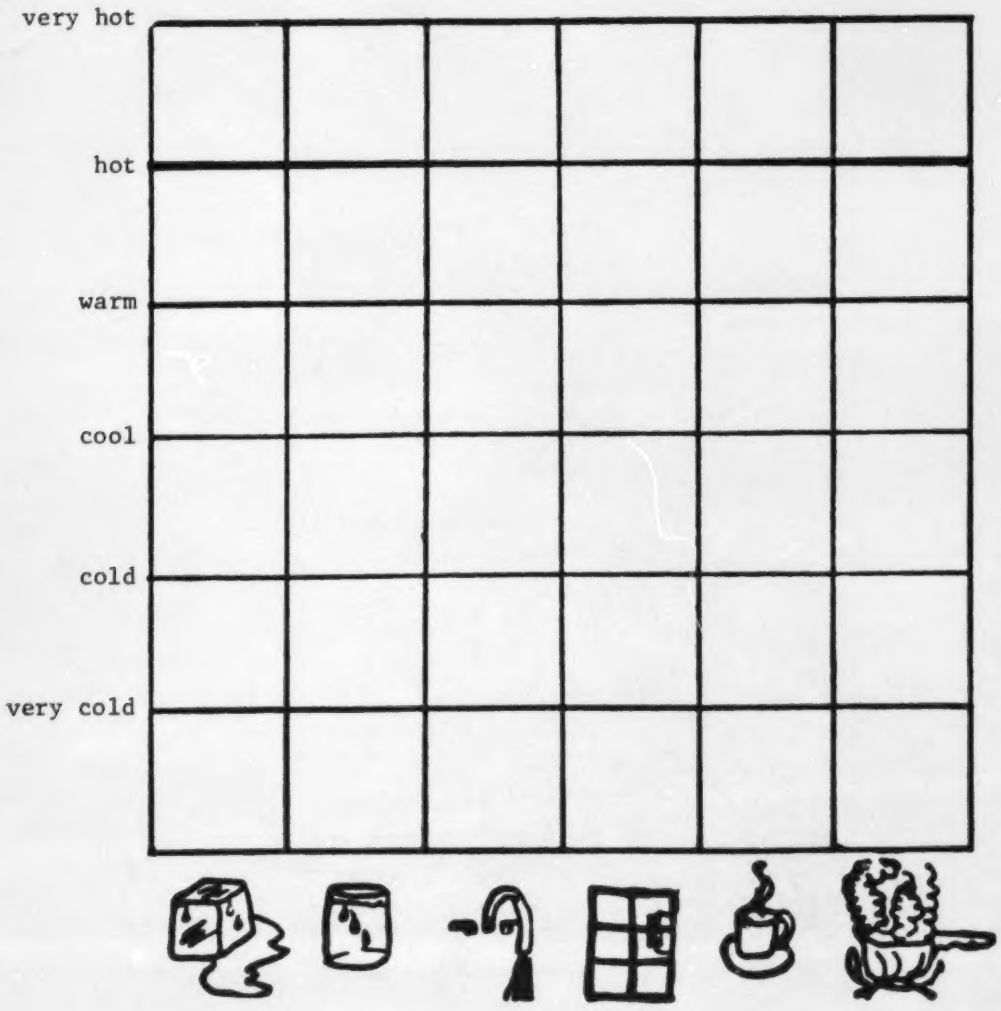


NAME _____ DATE _____

USE OF THE THERMOMETER

COLOR THE GRAPH ACCORDING TO WHAT YOU READ ON THE THERMOMETER.

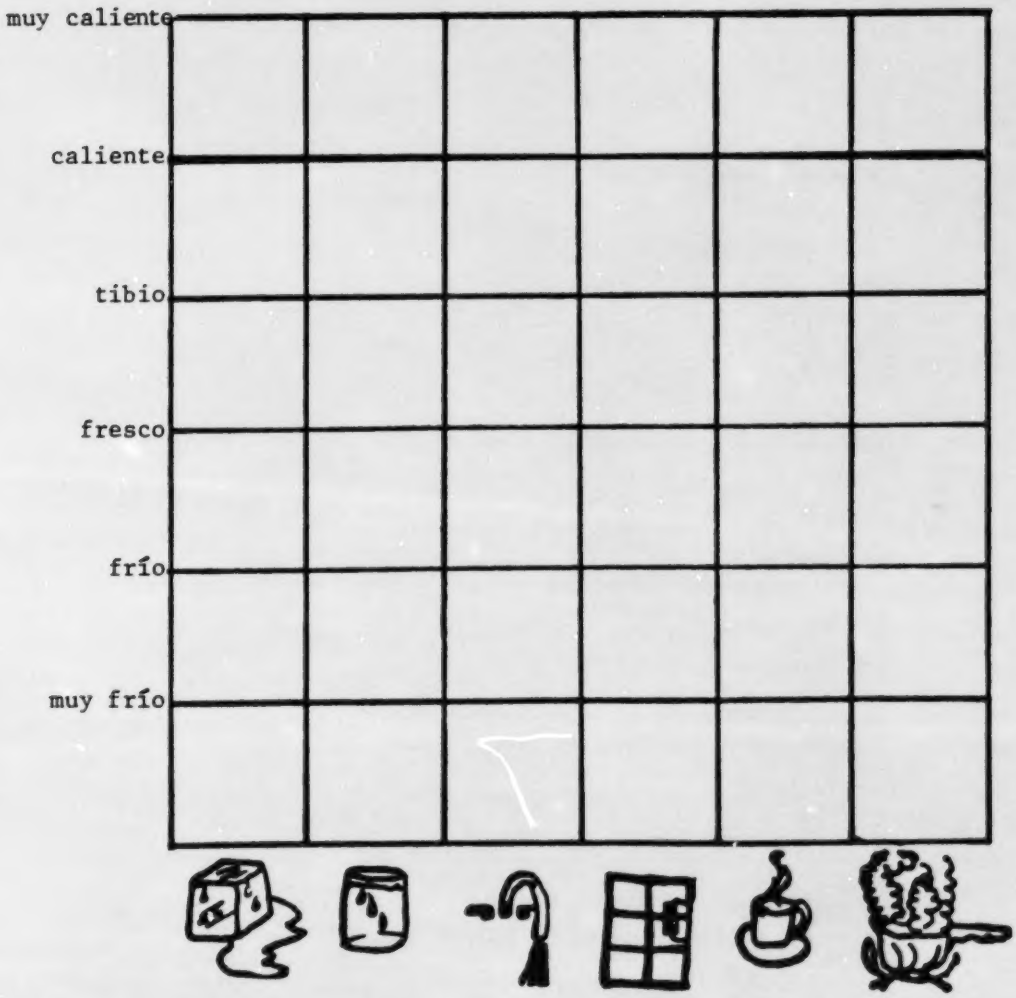
WHAT IS HAPPENING TO THE LINES?



NOMBRE_____ FECHA_____

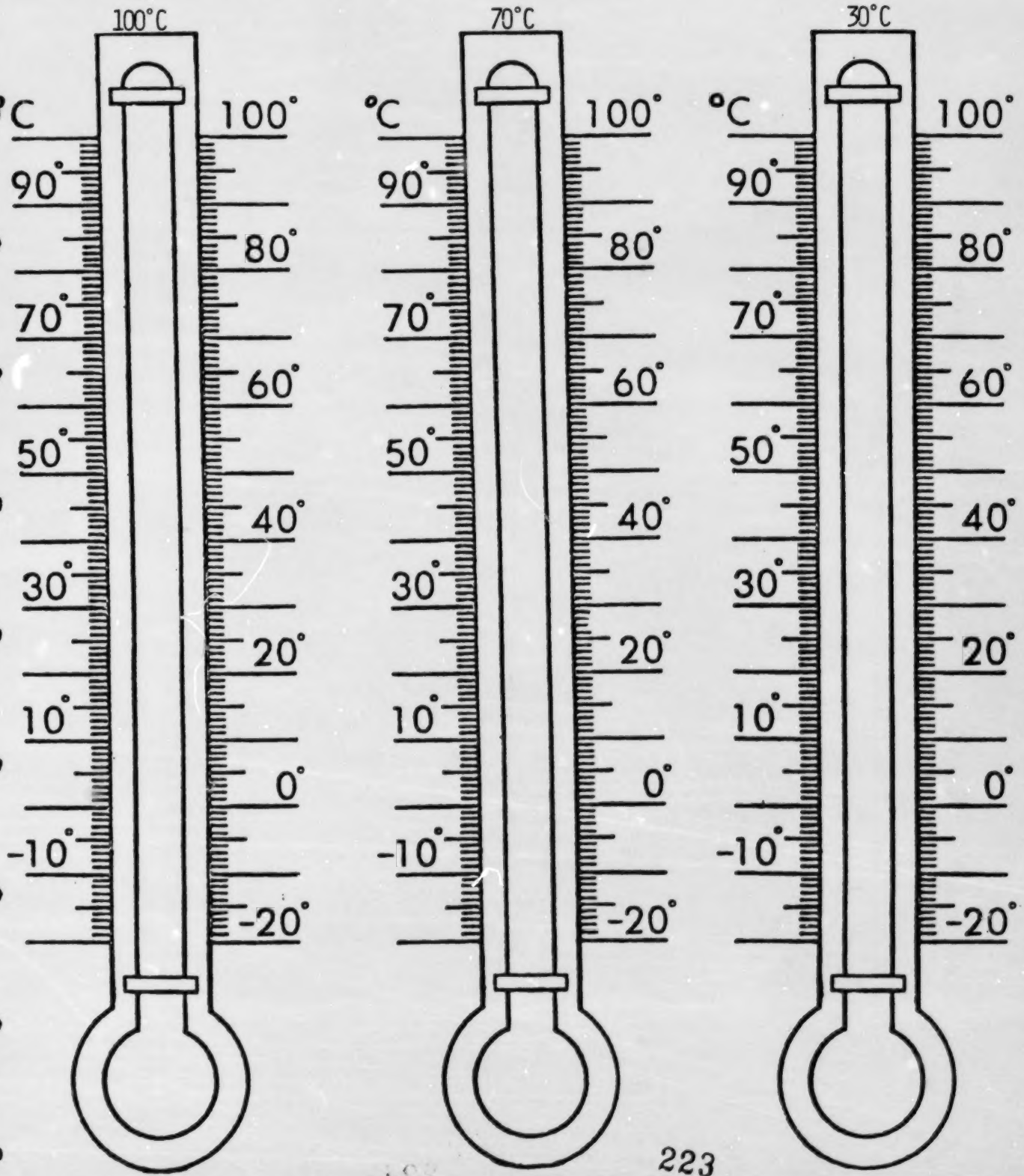
USO DEL TERMOMETRO

COLOREA LA GRÁFICA DE ACUERDO A LO QUE SE INDICA ESCRITO ENTRE LA TEMPERATURA Y LOS DIBUJOS.



NAME _____ DATE _____

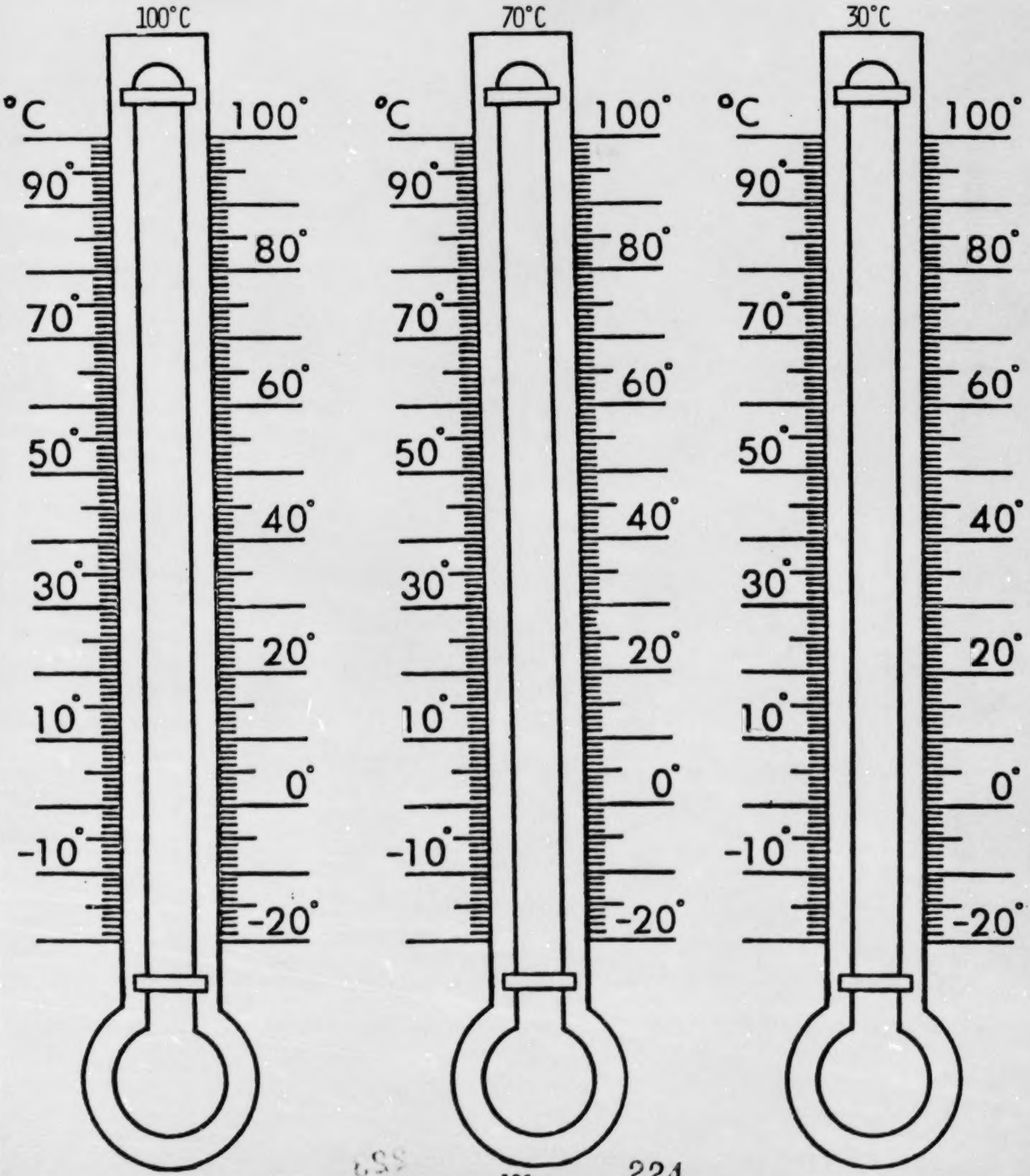
COLOR THE THERMOMETERS ACCORDING TO THE TEMPERATURES.



223

NOMBRE_____ FECHA_____

COLOREA LOS TERMÓMETROS DE ACUERDO A LAS TEMPERATURAS INDICADAS.



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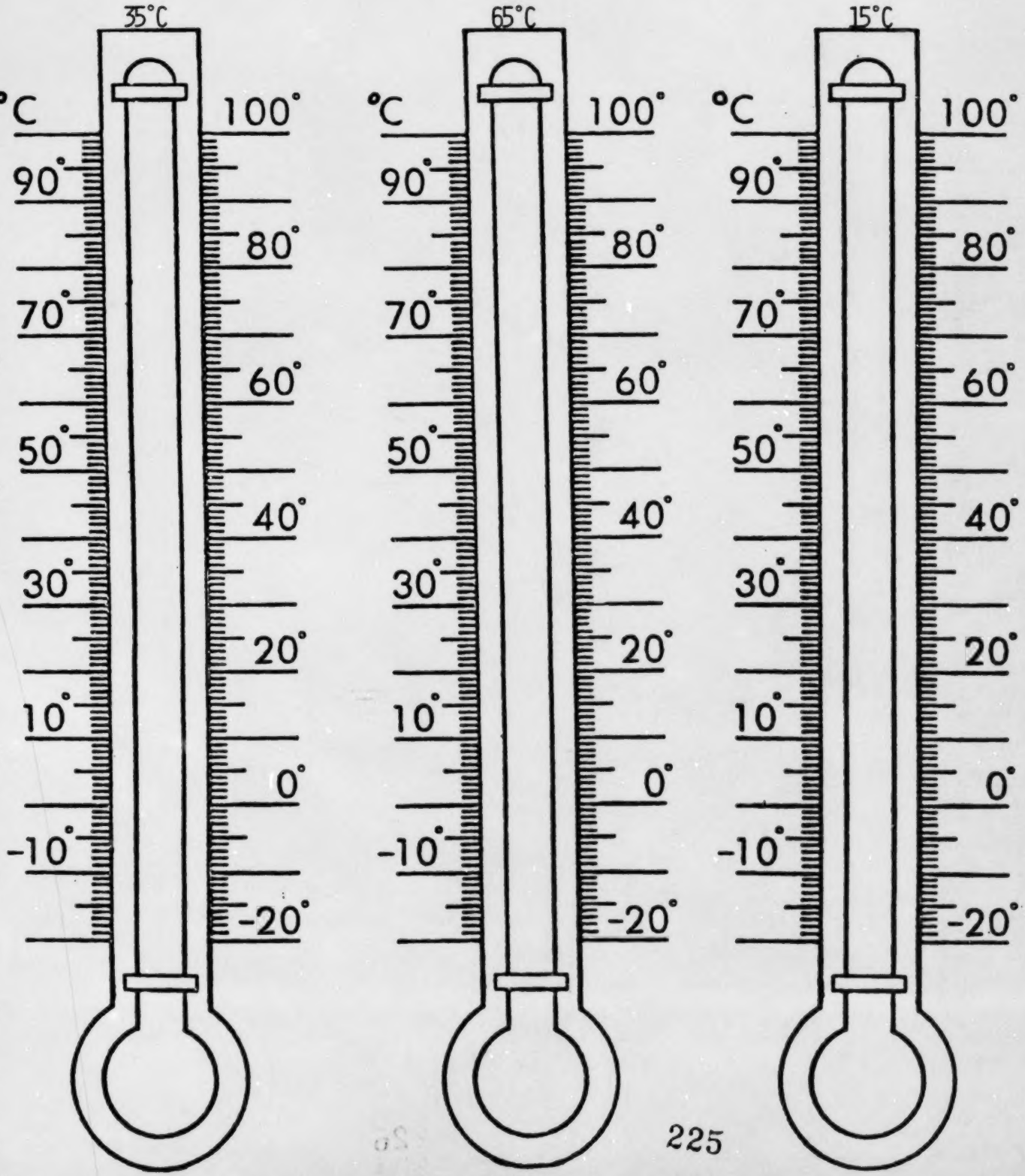
COLOR THE THERMOMETERS ACCORDING TO THE TEMPERATURES.



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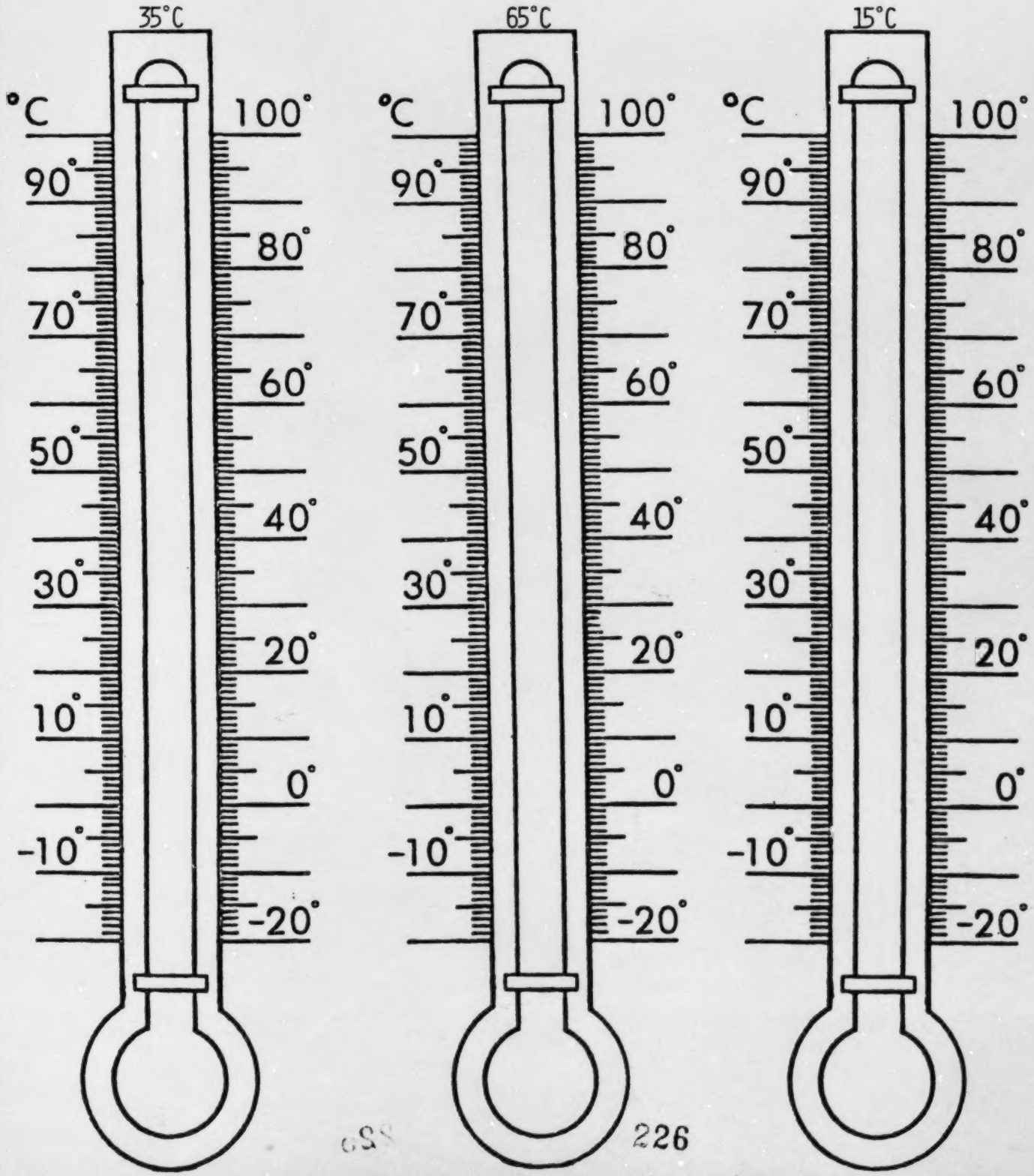
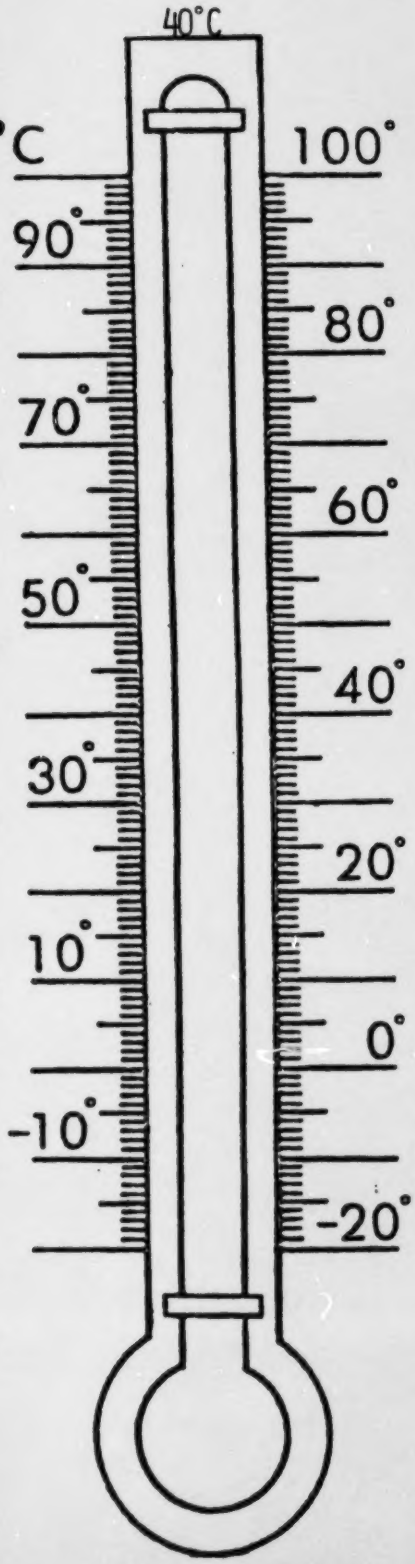
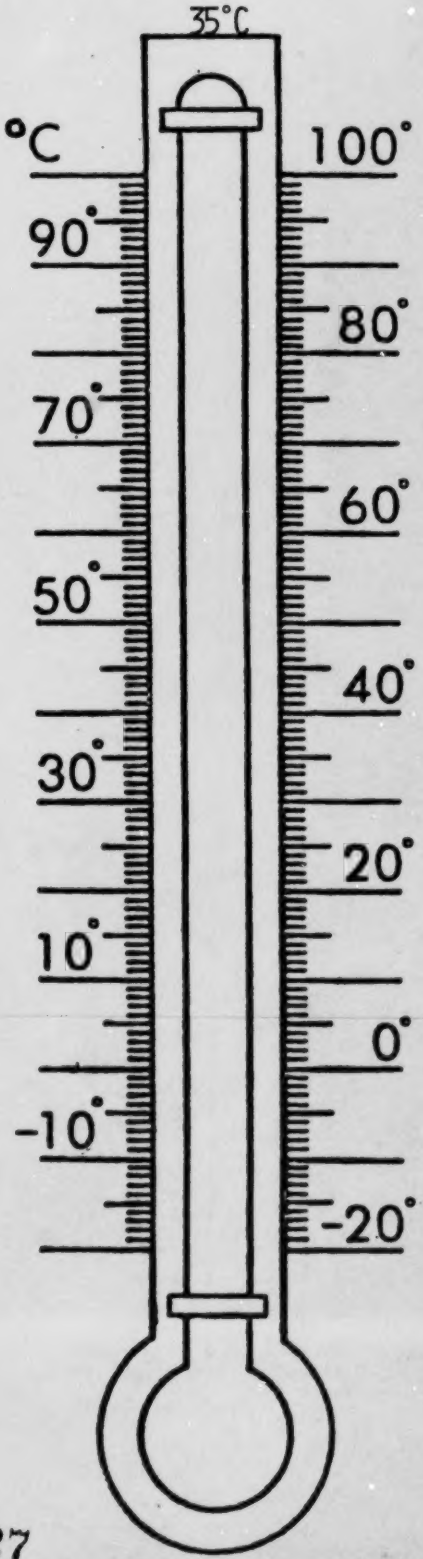


226

NAME _____ DATE _____

COLOR THE THERMOMETERS ACCORDING TO THE TEMPERATURES.





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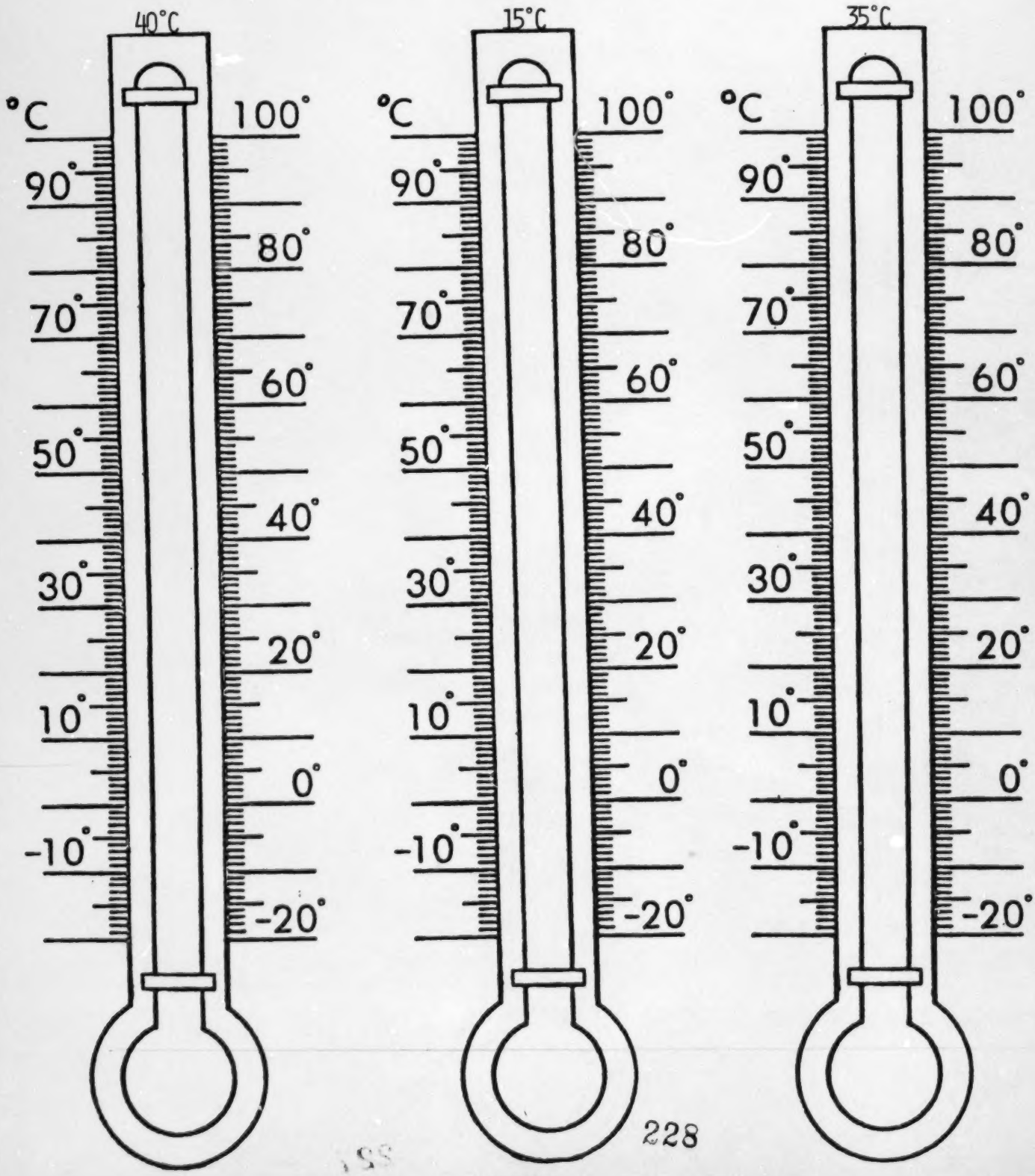
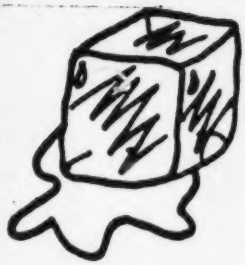


228

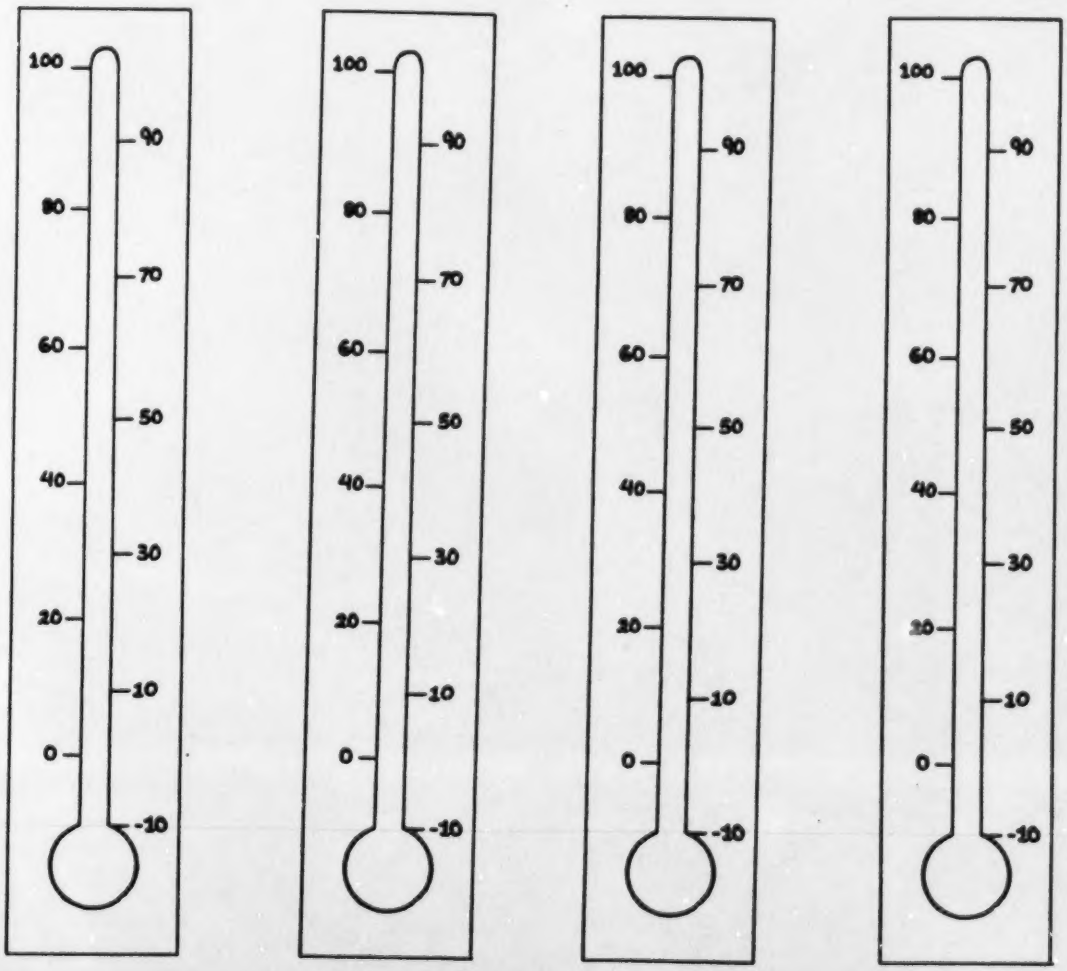
DEGREES CELSIUS

WHAT IS THE TEMPERATURE OF THE FOLLOWING:



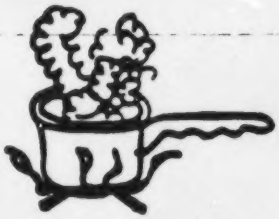
_____ °C _____ °C _____ °C _____ °C

COLOR THE THERMOMETERS.



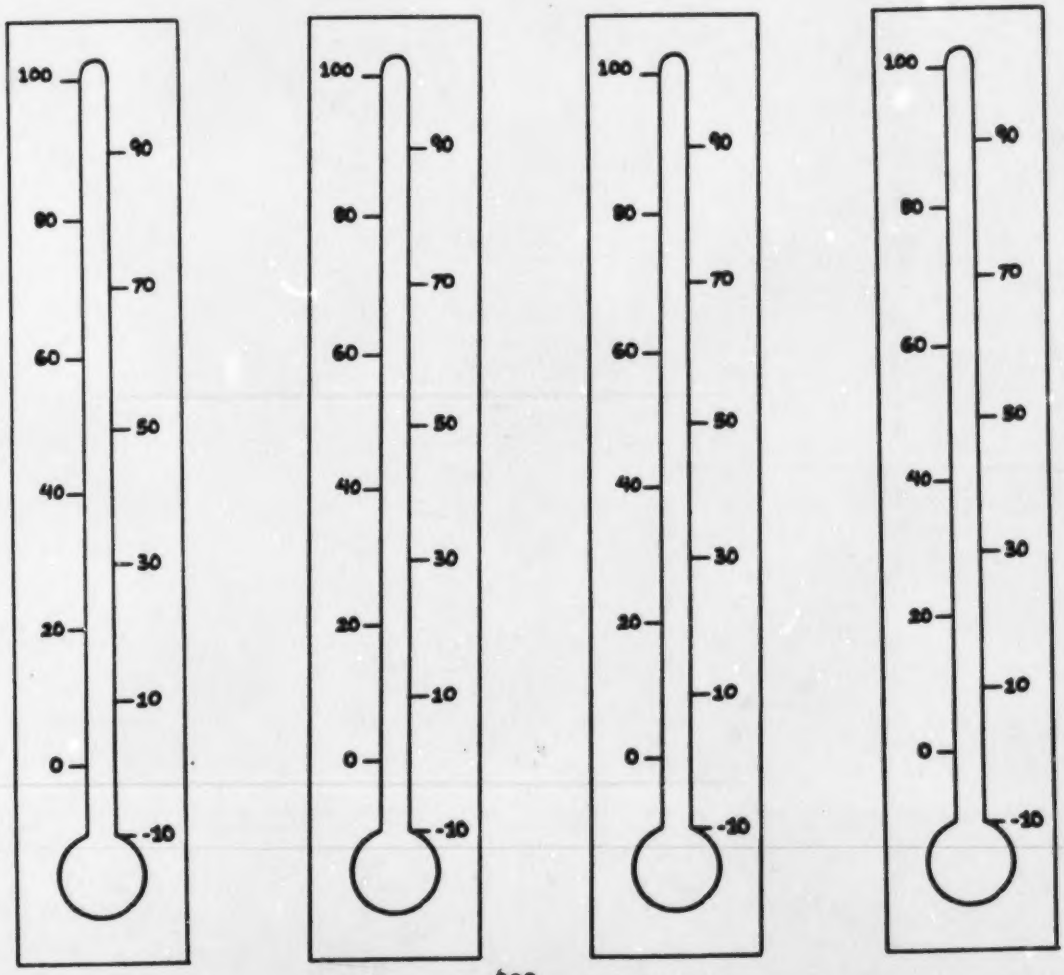
GRADOS CELSIUS

¿CUÁL ES LA TEMPERATURA DE LOS SIGUIENTES DIBUJOS?



_____ °C _____ °C _____ °C _____ °C

COLOREA LOS TERMÓMETROS.



NAME_____ DATE_____

GRADE_____

CELSIUS

ESTIMATE AND MEASURE THE TEMPERATURES OF THESE THINGS.

TEMPERATURE	DEGREES CELSIUS (°C)	
	Estimate	Measure
ROOM TEMPERATURE		
OUTSIDE AIR TEMPERATURE		
TEMPERATURE OF THE WATER FROM A DRINKING FOUNTAIN		
TEMPERATURE OF THE WATER JUST AS IT BOILS		
TEMPERATURE OF A PIECE OF ICE		
YOUR BODY TEMPERATURE TAKEN UNDER ARM		

NOMBRE_____ FECHA_____

GRADO_____

CELSIUS

Calcula y mide la temperatura de las siguientes cosas.

TEMPERATURA	GRADOS CELSIUS (°C)	
	Temperatura Calculada	Temperatura Medida
TEMPERATURA DEL SALON		
TEMPERATURA DE AFUERA DEL SALON		
TEMPERATURA DEL AGUA DE LA FUENTE		
TEMPERATURA DEL AGUA CUANDO HIERVE		
TEMPERATURA DE UN CUBO DE HIELO		
TEMPERATURA DEL CUERPO (ABAJO DEL BRAZO)		

NAME_____ DATE_____

GRADE_____

GREENHOUSE EFFECT

MATERIALS NEEDED

Black paper
2 Thermometers
Jar/lid
Stopwatch
Worksheets

ACTIVITY

1. Lay sheet of black paper in full sunlight.
2. Place one of the thermometers in a covered glass jar and lay it on its side on the black paper. Lay the other thermometer on the black paper.
3. Before reading the temperatures, estimate what each will be.
4. Read and record below the temperature of each thermometer every 2 minutes.
5. On the graph, record the temperatures shown on each thermometer, using a different color pen or pencil for each.

TIME (MIN)	TEMPERATURE INSIDE THE JAR	TEMPERATURE OUTSIDE THE JAR
0		
2		
4		
6		
8		
10		

NOMBRE_____ FECHA_____

GRADO_____

EFECTO DE INVERNADERO

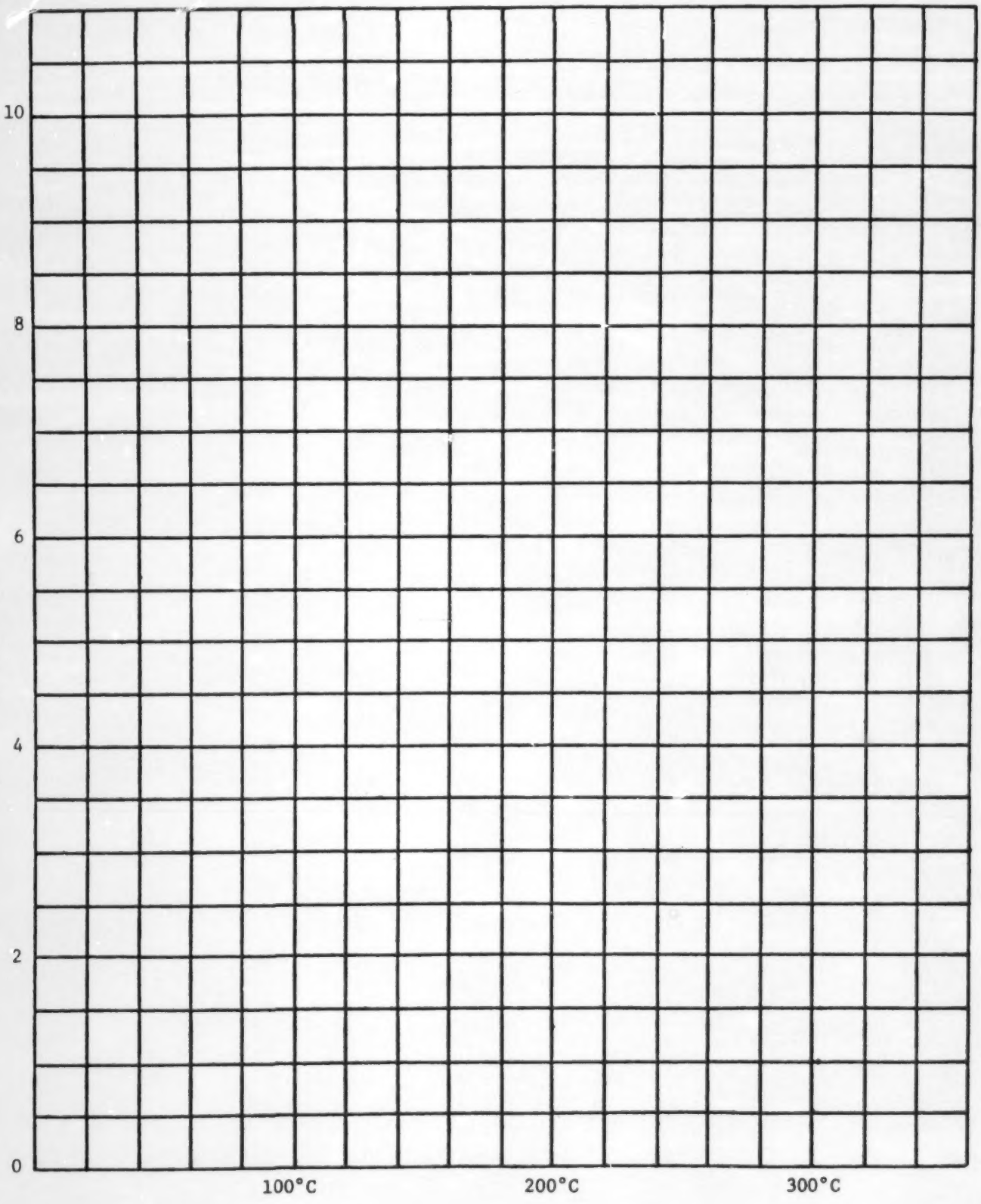
MATERIAL DEL TRABAJO

Papel negro
2 Termómetros
Un frasco grande con tapa
Un cronómetro
Hojas de papel para reporte

ACTIVIDAD

1. Pon una hoja de papel negro en la luz del sol.
2. Pon uno de los 2 termómetros dentro del frasco y tápalo; pon el frasco acostado sobre el papel negro. Pon el otro termómetro directamente sobre el papel negro.
3. Antes de leer las temperaturas de los termómetros, calcula cuales serían.
4. Lee y apunta la temperatura de los termómetros cada 2 minutos.
5. Escribe en la gráfica las temperaturas que leiste en cada termómetro, usa diferente color para cada termómetro.

TIEMPO (MINUTOS)	TEMPERATURA DENTRO DEL FRASCO	TEMPERATURA AFUERA DEL FRASCO
0		
2		
4		
6		
8		
10		



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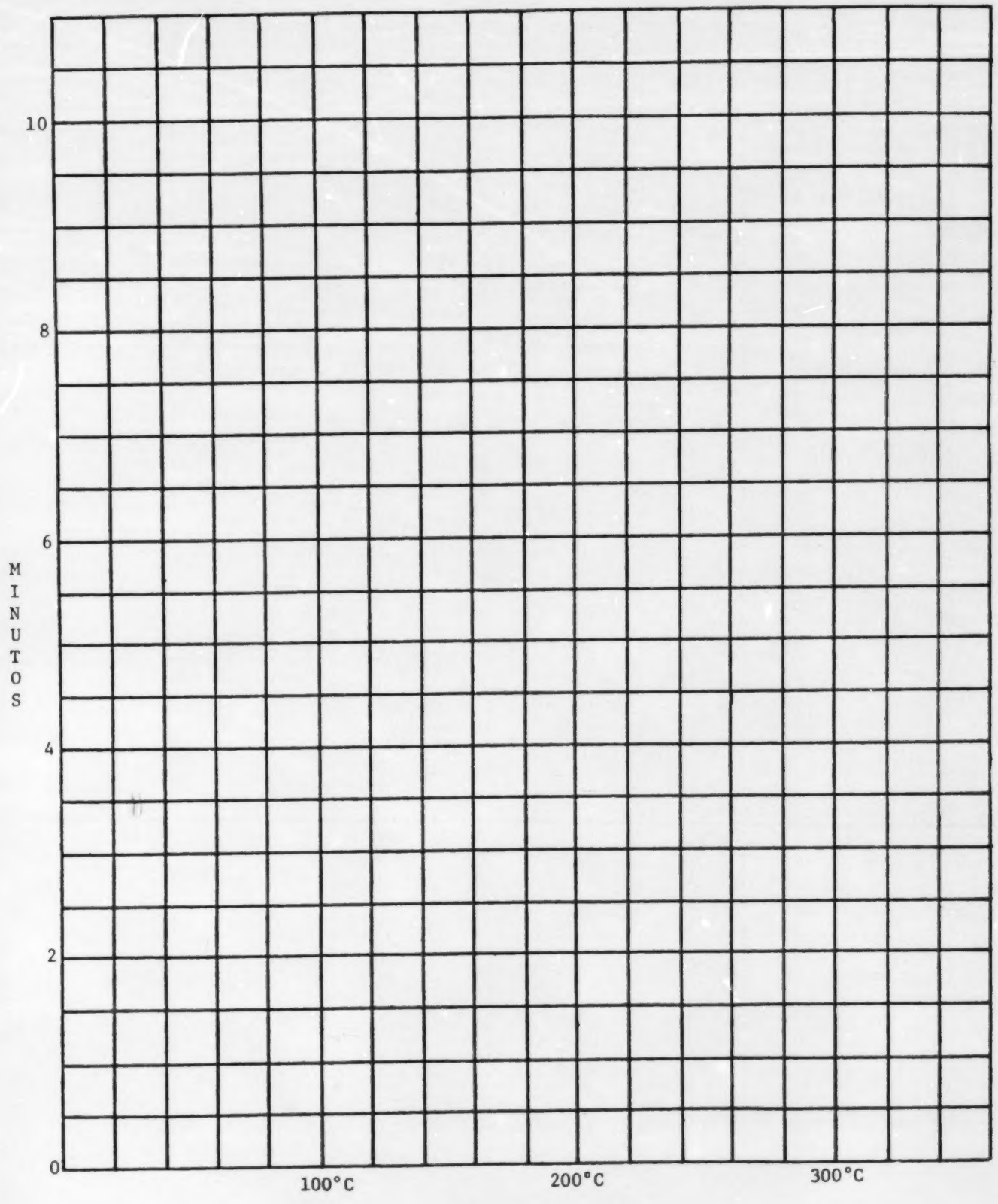

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NAME_____ DATE_____

GRADE_____ COOLING CURVE

MATERIALS NEEDED

Ice
500-mℓ container
Stopwatch
Thermometer
Worksheets

ACTIVITY

1. Students will be given a container of tap water (about half full), a container of ice cubes, a thermometer and a stopwatch.
2. The temperature of the water will be recorded.
3. Add 1 ice cube, stir for 1 minute, and record the temperature in column 2.
4. Continue as in #3, adding 1 ice cube at a time, stirring for one minute, and recording the temperature.
5. Stop adding ice cubes when the thermometer will go no lower.
6. Subtract the second reading from the first and record the difference in column 3.

NUMBER OF ICE CUBES	WATER TEMPERATURE	CHANGE IN TEMPERATURE
0	_____ °C	
1	_____ °C	_____ °C
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
	_____	_____
	_____	_____
	_____	_____

NOMBRE_____ FECHA_____

GRADO_____

CURVA DE ENFRIAMIENTO

MATERIAL DEL TRABAJO

Cubos de hielo
Un recipiente de 500 mℓ de capacidad
Un cronómetro
Un termómetro
Hojas de reporte

ACTIVIDAD

1. Llena la mitad del recipiente de 500 mℓ con agua de la llave.
2. Pon el termómetro dentro del recipiente con agua. Toma y apunta la temperatura.
3. Empieza a poner los cubos de hielo uno a uno cada minuto. Toma la temperatura cada minuto y apúntala en la columna 2. Agita el agua cada vez que pones un cubo de hielo.
4. Continúa adicionando uno a uno los cubos de hielo hasta que la temperatura no siga bajando en el termómetro.
5. Resta la lectura uno de la lectura dos y apunta la diferencia en la columna 3.

NUMERO DE CUBOS DE HIELO	TEMPERATURA DEL AGUA	CAMBIO EN LA TEMPERATURA
0	_____ °C	
1	_____ °C	_____ °C
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
	_____	_____
	_____	_____

NAME_____ DATE_____

GRADE_____

DIFFERENCES OF TEMPERATURES

DEGREES CELSIUS

MATERIALS NEEDED

Hot plate
Saucepan
Stopwatch
3 Juice cans - 1 wrapped in aluminum foil, 1 wrapped in newspaper
Plastic container
4 Thermometers
Worksheets

ACTIVITY

1. Using three empty cans of juice, do the following: Wrap one of the cans with tin foil, the other with newspaper and the last one is to be unwrapped.
2. Place the saucepan on the hot plate with enough water. When the water begins to boil, place the thermometer in the pan and record the temperature as soon as it stops rising.
3. Distribute the boiling water equally among the three cans, and place a thermometer in each of the cans.
4. Check and record the temperature at one minute intervals for 10 minutes.
5. Using graph paper and a different color pen or pencil, record the change in temperature for each can.

TIME	TEMPERATURE IN °C
0 minutes	
1 minute	
2 minutes	
3 minutes	
4 minutes	
5 minutes	
6 minutes	
7 minutes	
8 minutes	
9 minutes	
10 minutes	

NOMBRE_____ FECHA_____

GRADO_____

DIFERENCIA DE TEMPERATURAS EN GRADOS CELSIUS

MATERIAL DEL TRABAJO

Una parrilla eléctrica
Una cacerola
Un cronómetro
3 Latas de jugo vacías - 1 cubierta con papel aluminio,
y otra cubierta con papel periódico
1 Recipiente de plástico
4 Termómetros
Hojas de reporte
1 Recipiente de plástico

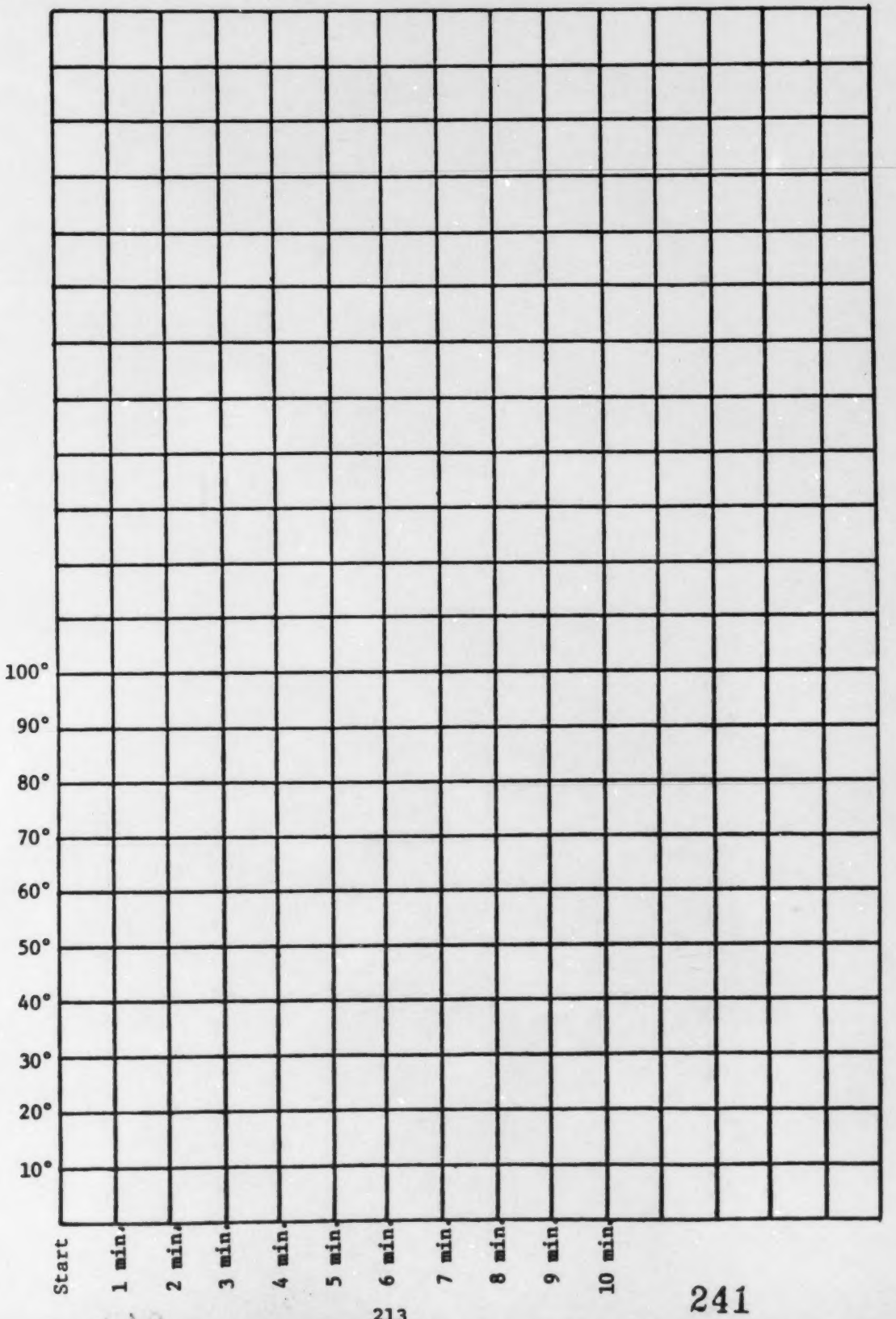
ACTIVIDAD

1. Prepara las latas de jugo vacías de la siguiente forma: Cubre una de las latas con papel aluminio, otra con papel periódico y deja la última sin cubrir.
2. Pon la cacerola con suficiente agua sobre la parrilla hasta que hierva. Toma la temperatura del agua hasta que el termómetro marque una temperatura constante.
3. Pon suficiente agua caliente de la cacerola en las latas y pon un termómetro en cada lata.
4. Toma la temperatura con intervalos de un minuto durante 10 minutos y apúntala.
5. Haz una gráfica. Usa un color diferente para marcar el cambio de temperatura de cada lata.

TIEMPO	TEMPERATURA EN °C
0 minutos	
1 minuto	
2 minutos	
3 minutos	
4 minutos	
5 minutos	
6 minutos	
7 minutos	
8 minutos	
9 minutos	
10 minutos	

NAME_____ DATE_____

GRADE_____ DEGREES CELSIUS



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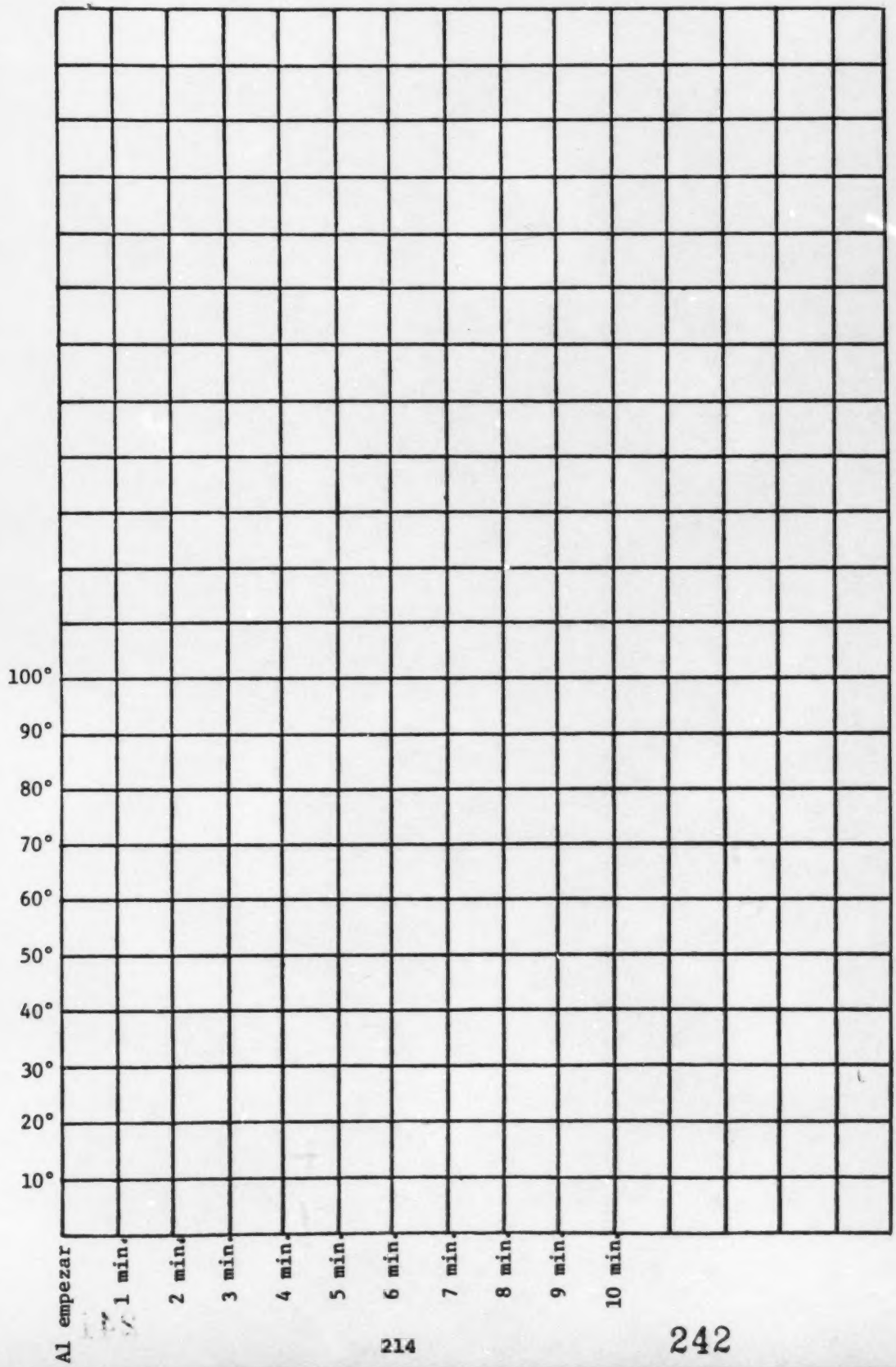
NOMBRE_____ FECHA_____

GRADO_____

GRADOS CELSIUS



NAME_____ DATE_____

GRADE_____

EFFECT OF SALT

MATERIALS NEEDED

Ice
Hot plate
Saucepan
Salt
50-mℓ cup
600-mℓ container
Spoon
2 Thermometers

ACTIVITY

1. Place pan of water on hot plate. Read and record temperature as water begins to boil around bulb of thermometer.
2. Empty the pan and then dissolve 50 mg of salt in water in the same pan. Repeat step #1.
3. Place a different thermometer in a container of ice. Read and record temperature.
4. Pour 50 mg of salt into the container with ice. Stir if possible. Read and record temperature.

ACTIVITY	TEMPERATURE IN °C
Boiling temp./no salt	
Boiling temp./with salt	
Freezing temp./no salt	
Freezing temp./with salt	

NOMBRE_____ FECHA_____

GRADO_____

EFECTO DE SAL

MATERIAL DEL TRABAJO

Cubos de hielo
Una parrilla eléctrica
Una cacerola
Un kilo de sal
Una tasa de 50 mℓ de capacidad
Un recipiente de 600 mℓ de capacidad
Una cuchara
2 Termómetros

ACTIVIDAD

1. Pon la cacerola con suficiente agua sobre la parrilla. Pon el termómetro dentro del agua al empezar a hervir. Toma la temperatura y apúntala.
2. Vacía el agua de la cacerola. Disuelve 50 gramos de sal en suficiente agua. Pon suficiente agua con sal en la cacerola y repite el procedimiento como en la etapa 1.
3. Pon un termómetro en un recipiente que contenga hielo. Toma la temperatura y apúntala.
4. Agrega 50 gramos de sal en el recipiente que contiene hielo. Agita si es necesario. Toma la temperatura y apúntala.

ACTIVIDAD	TEMPERATURA EN °C
Temperatura de ebullición del agua/sin sal	
Temperatura de ebullición del agua/con sal	
Temperatura de fusión del hielo/sin sal	
Temperatura de fusión del hielo/con sal	

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NAME _____ DATE _____

EXERCISES

TEMPERATURE CHART

For the week of _____

Measure the temperature outside of the classroom for a week; record it 3 times a day.

DAY (Morning)	TIME	TEMPERATURE
MONDAY		°C °C °C
TUESDAY		°C °C °C
WEDNESDAY		°C °C °C
THURSDAY		°C °C °C
FRIDAY		°C °C °C

NOMBRE_____ FECHA_____

EJERCICIOS

TABLA DE TEMPERATURA

De la semana_____

Toma la temperatura de afuera del salón durante una semana, 3 veces al día y apúntala en la tabla.

DIA (Mañana)	HORA	TEMPERATURA
LUNES		°C °C °C
MARTES		°C °C °C
MIERCOLES		°C °C °C
JUEVES		°C °C °C
VIERNES		°C °C °C

NAME _____ DATE _____

EXERCISES

In each of the following questions, choose the correct answer and place a checkmark in the space provided.

1. Normal body temperature is about:
   - A. _____ 20°C
   - B. _____ 37°C
   - C. _____ 47°C

2. The water freezes at:
   - A. _____ 10°C
   - B. _____ 0°C
   - C. _____ 15°C

3. A nice hot bath is:
   - A. _____ 5°C
   - B. _____ 30°C
   - C. _____ 90°C

4. Comfortable room temperature is:
   - A. _____ 38°C
   - B. _____ 10°C
   - C. _____ 20°C

5. A nice summer day is:
   - A. _____ 10°C
   - B. _____ 25°C
   - C. _____ 37°C

NOMBRE_____ FECHA_____

EJERCICIOS

Marca con una cruz la respuesta correcta de las siguientes preguntas:

1. La temperatura normal del cuerpo es:
   A. _____ 20°C
   B. _____ 37°C
   C. _____ 47°C

2. El agua se congela a la temperatura de:
   A. _____ 10°C
   B. _____ 0°C
   C. _____ 15°C

3. Para tomar un baño de tina la temperatura más agradable del agua es de:
   A. _____ 5°C
   B. _____ 30°C
   C. _____ 90°C

4. La temperatura más agradable en el interior de un cuarto es de:
   A. _____ 38°C
   B. _____ 10°C
   C. _____ 20°C

5. La temperatura más agradable de un día de verano es de:
   A. _____ 10°C
   B. _____ 25°C
   C. _____ 37°C

NAME_____ DATE_____

EXERCISES

Answer the following questions with "yes" or "no".

1. The thermometer reads 28°C. Do you need a winter coat?

   _____

2. If the temperature of you body is 39°C, are you sick?

   _____

3. The thermometer reads 5°C. Are you going swimming?

   _____

4. If you want to take a bath, and the water is 10°C, is the water hot?

   _____

5. If the temperature of the oven is 175°C, is the oven ready to bake a cake?

   _____

NOMBRE_____ FECHA_____

EJERCICIOS

Contesta "si" o "no" a las siguientes preguntas:

1. Si el termómetro marca 28°C, ¿Necesitas un abrigo?

   _____

2. Si la temperatura de tu cuerpo es de 39°C, ¿Estas enfermo?

   _____

3. Si el termómetro marca 5°C, ¿Vas tú a nadar?

   _____

4. Si vas a tomar un baño de tina y la temperatura del agua es de 10°C, ¿El agua está caliente?

   _____

5. Si la temperatura del horno es de 175°C, ¿Está listo el horno para hornear un pastel?

   _____

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